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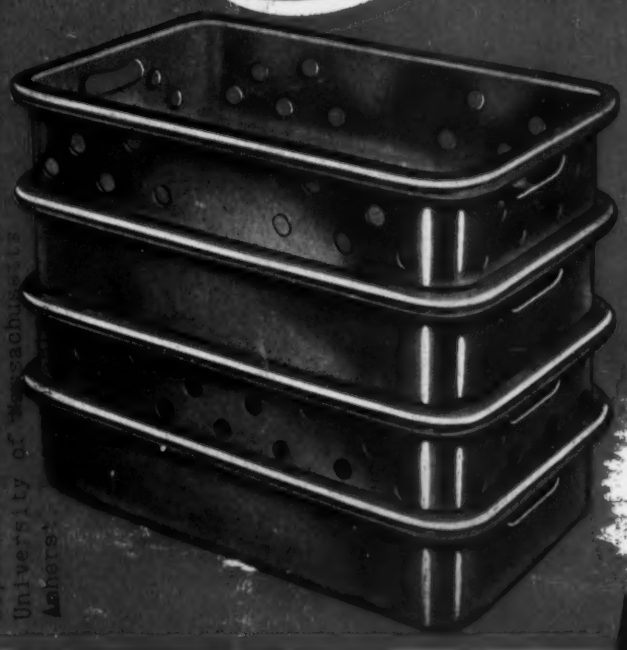

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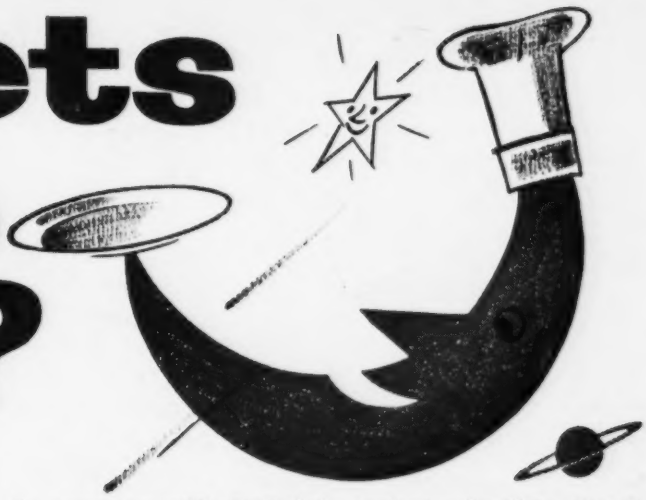

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Tomato Purée (30% solids)	68 lb.
Sugar	18 lb.
Skim Milk Powder	17 lb.
Butter	10 lb.
Cornflour	5½ lb.
Salt	4 lb.
PROTEX No. 8	10 oz.
M.S.G.	10 oz.
Saromex Onion (on Salt)	8 oz.
Saromex Garlic (on Salt)	1 oz.
Saromex Pepper (on Salt)	½ oz.
Sodium Bicarbonate	Sufficient to adjust finished soup to pH 4.6—4.7.

Bulk to 30 gallons with water.

Bulk to volume and whisk vigorously in stainless steel steam-heated pan, fitted with a stirrer. Bring to the boil and simmer for 5 minutes. Homogenize at 1,500—2,000 p.s.i. and 180°F. and fill into plain No. 1 Tall cans at 200°F. Seal and process at 225°F. for 1¼ hours and water cool. The pH of the processed soup should be 4.6—4.7.

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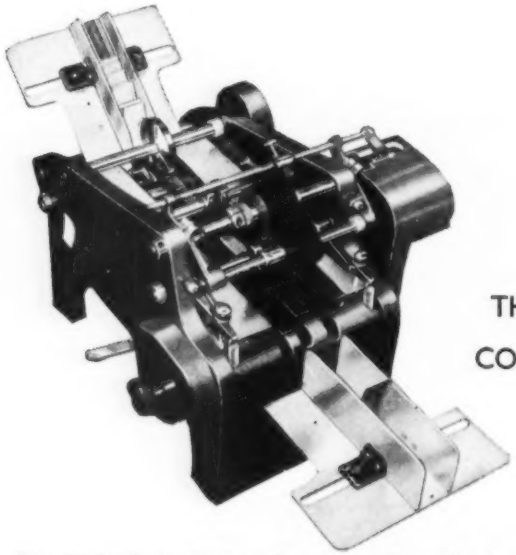

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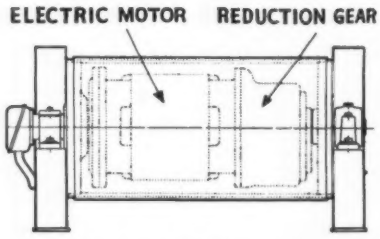

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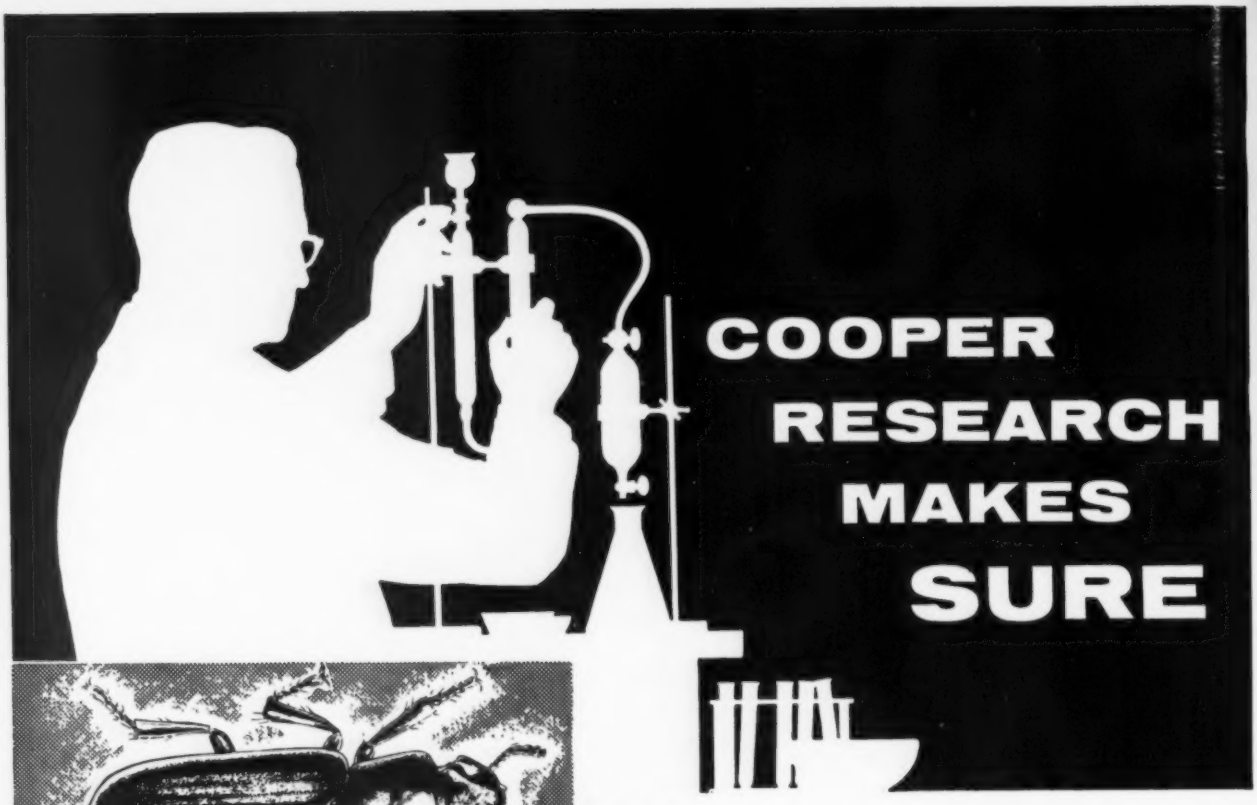

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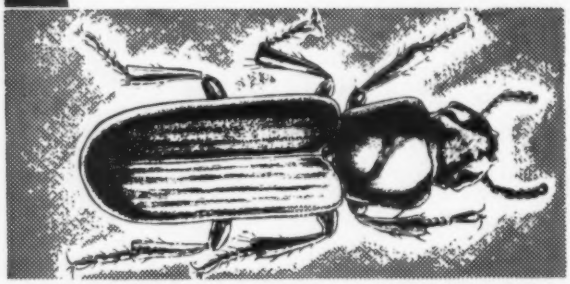
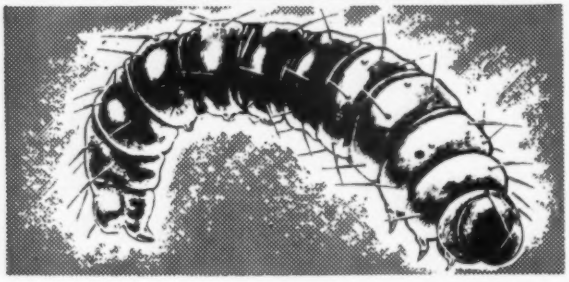


Flour Beetle (Actual size, approx. 4 mm)



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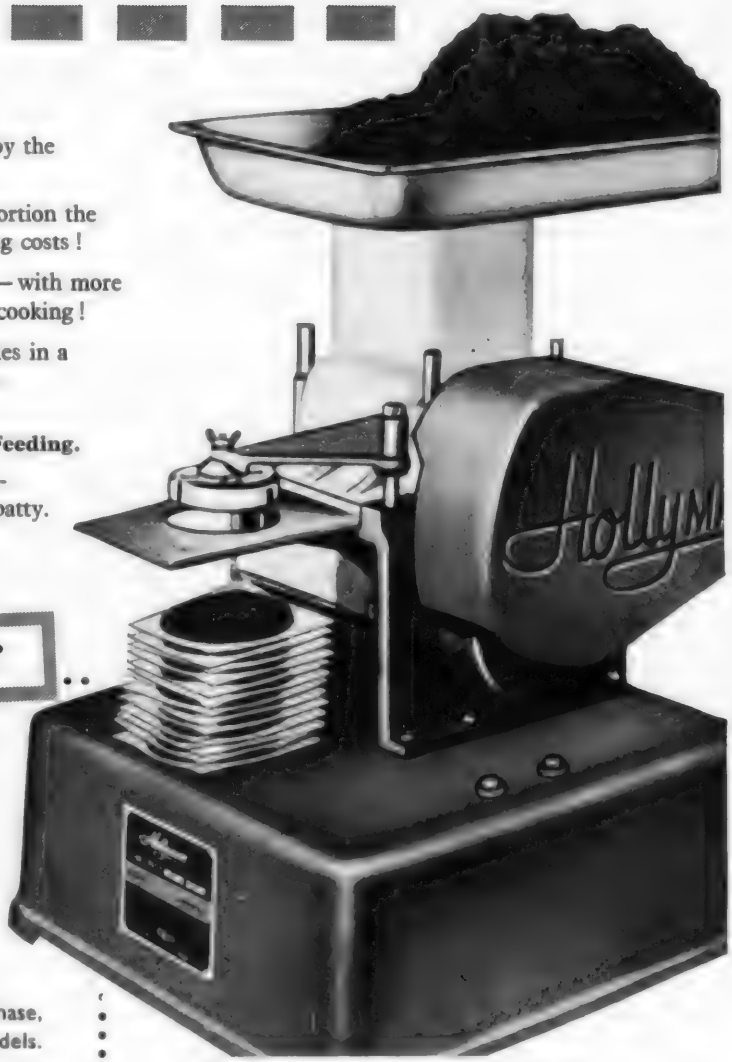

SPECIFICATIONS

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You will start saving money as soon as you install Multipac, and you'll go on doing so. The Multipac is British-designed, Clyde-built . . . tough, neat, as compact as a bantam champion, and just as agile when it has varying loads to meet. And it works quietly . . . on and on and on. Clean it? Just the fire-tubes and chamber now and again, and you'll have to look hard for the soot. Brickwork replacement? There is no brickwork; Multipac has a new design of wet-back combustion chamber which eliminates refractory linings.

Put Multipac straight in. It comes to you complete, factory tested, ready to stand on a very small floor space and go to work . . . 82% efficiency easily.

We will gladly send you descriptive literature. But better still, write or telephone to say you are coming to see a Multipac at work. We'll be delighted.

This boiler can also be supplied for use with solid fuels.

Multipac

Wet-back. Fully Automatic with fully modulating oil burner.

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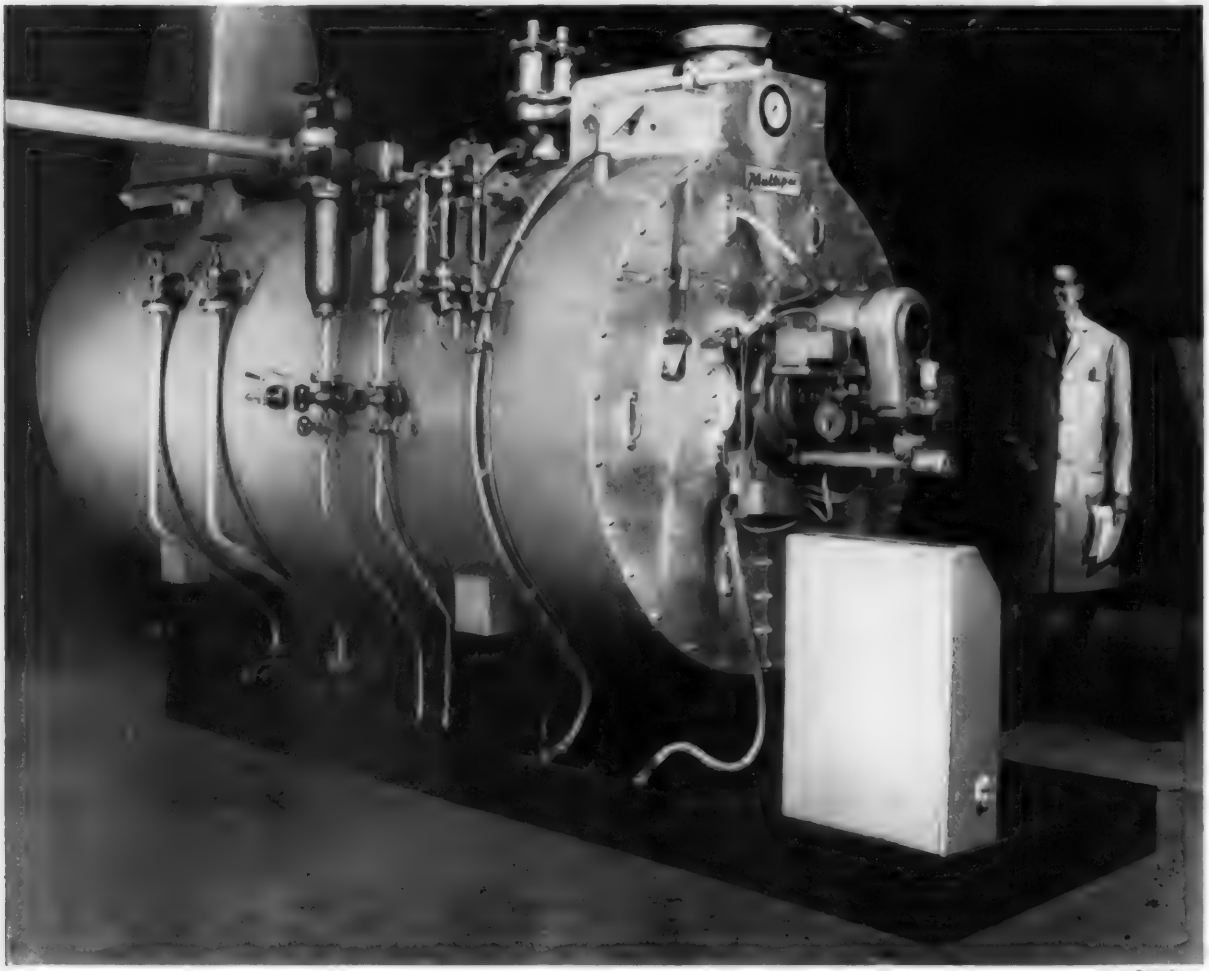
JOHN THOMPSON (WILSON BOILERS) LTD. • LILYBANK WORKS • LONDON ROAD • GLASGOW E.1.



GI/10

Size: 12½" x 9½" x 6½"
Weight: 14 lbs

FOSTER Portable Potentiometer

AND PYROMETER TESTER

Developed from the long and successful line of Foster Portable Potentiometers now comes Model 3155, which retains all the outstanding features of the previous models despite reduction in size and weight by over 50%. Main scale remains 14" long, cold-junction scale 6" long.

Still completely self-contained, incorporating sensitive null deflection galvanometer, standard cell, standardising switch and rheostat and long life dry cell. Instructions for use and relative diagrams are printed on a metal plate permanently fitted in the lid. Built-in optional extra features are :— Electrical Resistance Measurement facilities, Potential Divider with coarse and fine adjustment, and long life dry cell. The strong case of aluminium alloy is finished with a hard-wearing polychromatic Aleutian grey paint.

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0 — 20 mV. single range
0 — 60 mV. single range
0 — 20 mV. and 0 — 60 mV. double range
0 — 20 mV. and one temperature range
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Temperature scales may be in °C or °F
Special ranges to order
Resistance Measurement :
0 — 20 ohms and 0 — 200 ohms reading on 20 mV. scale
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tanks, high and low pressure vessels, vacuum receivers, distillation plants, agitators, heat exchangers, mobile vessels and tankers, cone blenders, boiling pans, hoppers, etc.

Standard 500 gallon F.M.B. quality vertical storage tank.

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Stainless Steel, "Monel" Metal, Nickel, and Mild Steel.

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highly skilled staff, conversant with modern welding techniques and manufacturing "know how" utilising Argon arc, Metallic arc, and resistance welding.

500 gallon pressure reaction agitator. F.M.B. quality, Polished inside and out. By courtesy of Messrs. Van den Burgh & Jurgens.

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THE HEART OF THE MATTER

Plenty positive displacement pumps are suitable for almost all food and chemical processes. They can be supplied with fixed or variable and reversible capacity; and with Servo or automatic control. Illustrated is a special pump designed to the Milk Marketing Board's requirements. Fitted with a mechanical seal, this pump can be completely dismantled for thorough sterilizing in less than a minute without any tools. It is as easily and quickly reassembled.

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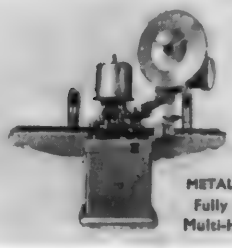
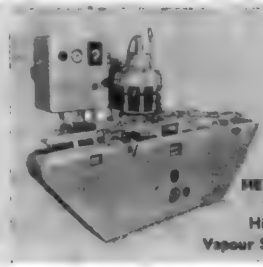
Metal Box offers you a complete capping service

Illustrated are metal closures.
A new range of plastic closures
is also available.



METAL BOX CMS
Fully Automatic
Multi-Head Capper



METAL BOX
CM700
High Speed
Vapour Sealing Machine

1. Knurlless R3 pickle jar screw caps with conventional wads or flowed-in gaskets.
2. Phoenix closures, for meat or fish paste.
3. Quarter turn caps, quickly removable and with quick positive re-seal.
4. Garda vacuum caps.
5. R3 standard screw caps.
6. Goldie pharmaceutical seals.
7. Clamp, Metwood and improved Metwood metal top cork stoppers.

The Metal Box range of caps and closures —for a variety of products from preserves to pharmaceuticals—includes vacuum, screw, and banded caps; several types of cork stopper; and a new range of plastic closures for use with plastic, glass or other containers. Superb Metal Box colour printing adds greatly to display-appeal and makes for easier brand identification. Caps can be supplied in all sizes with a flowed-in gasket (compound lined) or conventional wads. In addition Metal Box provide appropriate capping equipment which is fully serviced by specialist engineers. Metal Box design and research teams are constantly working to improve caps and capping methods. The services of their specialist engineers can always be directed to solving any individual problem of capping and closure. Write for more information.

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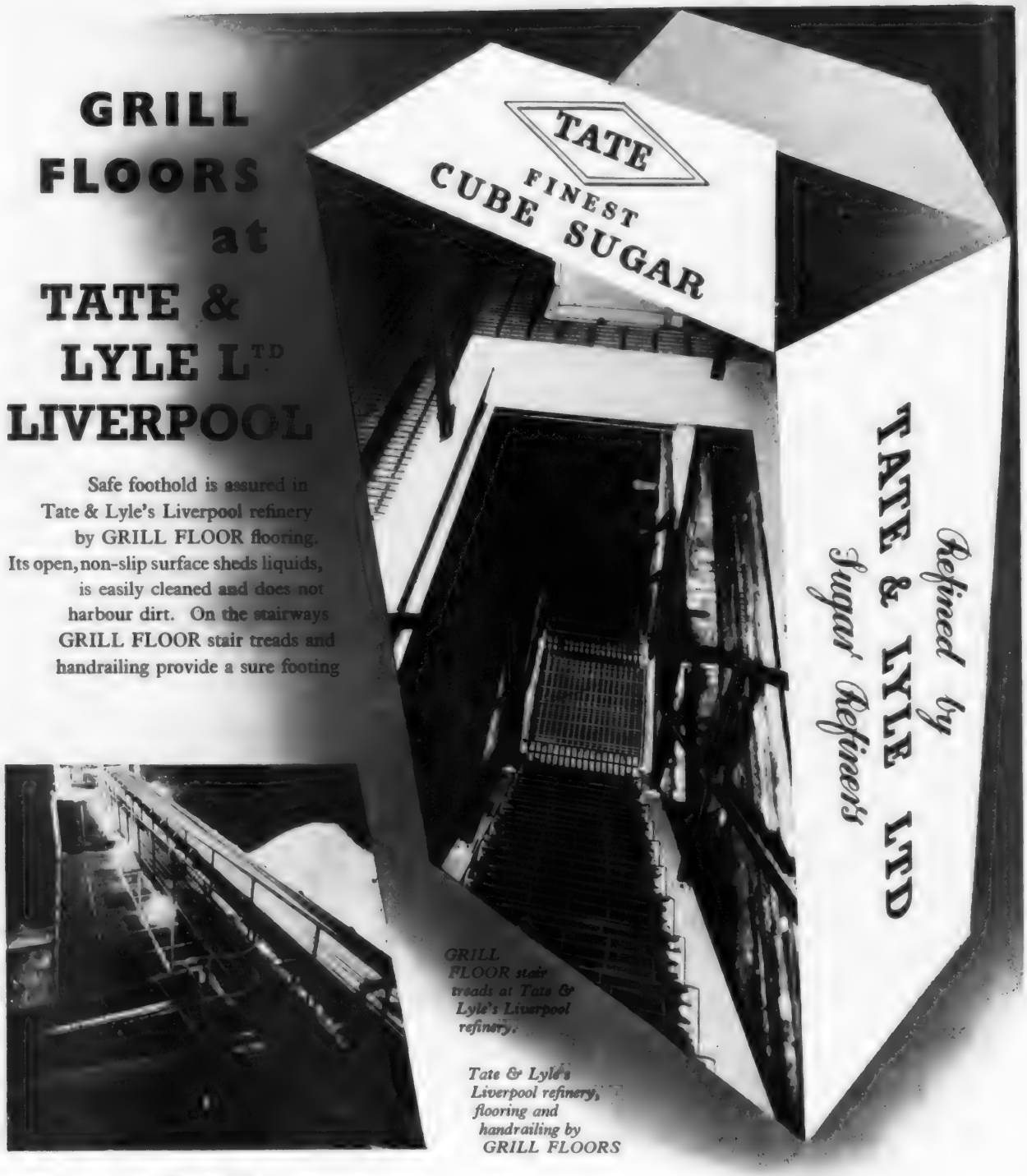
GRILL FLOORS at TATE & LYLE LTD LIVERPOOL

Safe foothold is assured in Tate & Lyle's Liverpool refinery by GRILL FLOOR flooring. Its open, non-slip surface sheds liquids, is easily cleaned and does not harbour dirt. On the stairways GRILL FLOOR stair treads and handrailing provide a sure footing



GRILL FLOOR stair treads at Tate & Lyle's Liverpool refinery.

Tate & Lyle's Liverpool refinery, flooring and handrailing by GRILL FLOORS

GRILL walkways

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GRILL FLOORS LTD LONDON W.10

P797

Bottles sta

My dear, you'd never *dream* what trouble I've had with Roderick lately. He's had bottles on the brain. No, dear, *brain* — not train. One night he sat bolt upright in bed and chanted (positively chanted):— *Bottles stand on their caps.* Just like that. Then a lot of rigmarole about juice all over his factory floor. Sticky situation. Send for Production Manager. Send for Foreman. My dear, I was nearly sending for a Harley Street headshrinker, by that time. Oh, he's all right now. Something called United Glass. No, not a wonder-drug, darling. They make both bottles *and* caps. Closures, Roderick calls them. *Closures*, not roses, dear. Roderick says the cap always fits when you buy bottles from United Glass. And as I say to Roderick, if the cap fits, wear it . . .

United Glass is the only British maker of bottles with its own closure division. And it's the only company with as many as eight bottle factories. They supply bottles to thousands of customers for a wide range of products. The Glass Packaging Advisory Bureau, set up by United Glass, will be glad to advise you on all your glass packaging problems. Please get in touch.

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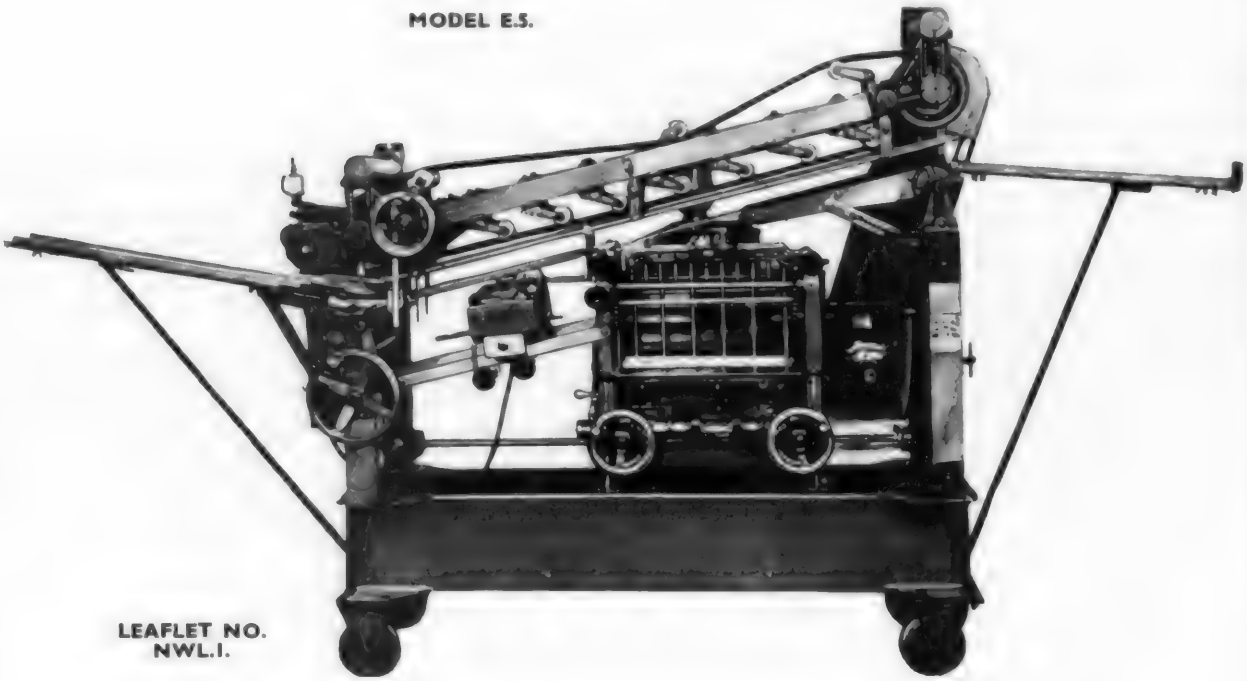
[C]

"NEW-WAY" HEAVY DUTY CAN LABELLER

This heavy duty 'NEW-WAY' model E.5. straight through can labeller incorporates a new elevating feature with high discharge point that in many cases permits direct gravity feed to the 'caser'.

It will handle from 50 to 500 or more containers per minute, with equal facility, depending on size of can and consistency of feed. The label magazine holds 3,000 labels and can be re-filled without stopping the machine.

MODEL E.5.



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PURDY MACHINERY CO. LTD

41-42 PRESCOT STREET LONDON E.1

ROYAL 8401

Handles tin, glass, fibre or other cylindrical containers from 108 to 502 ($1\frac{1}{2}$" to $5\frac{1}{8}$") diameter by 112 to 708 ($1\frac{3}{4}$" to $7\frac{1}{2}$") in height without use of change parts. Change from one size to another taking only 2 minutes. Other features include: infinitely variable speed drive, 2kW gum pot heater with accurate thermostatic control.

JACW/P/4

It takes feeling as well as thinking...

What exactly does 'design' mean? Some electrical engineers restrict it to electrical design which results in a set of figures. But this is only the half-way house. Design in its full sense must surely include everything that dictates what shall be made —down to the working drawings and detailed production methods. In these later stages less can be calculated, more depends on knowledge and on that cerebral computer, imagination, which fed with experience, often delivers its answer as an unquestioned certainty: as a direct feeling for the right job. How right these answers are depends on the experience of the designer—and of the company for which he works.

Take, for instance, fractional horsepower motors

Take our new 'T' range in particular. The electrical design was orthodox, the calculations based on accepted principles. But in constructional design, we, like everyone else, had to rely to a considerable extent on our designers' flair—their feeling for the right job. In the cooling system, for instance, we adopted a low-velocity central discharge, because we felt that the advantages of this arrangement far out-weighed any extra manufacturing difficulty it involved. The advantages show up in practice; it is impossible to evaluate them numerically. On points like this there is, therefore, almost always argument—in which the common stock of experience of the works plays a decisive part. And, we having been in the game so long, the stock is large and the argument hard fought.

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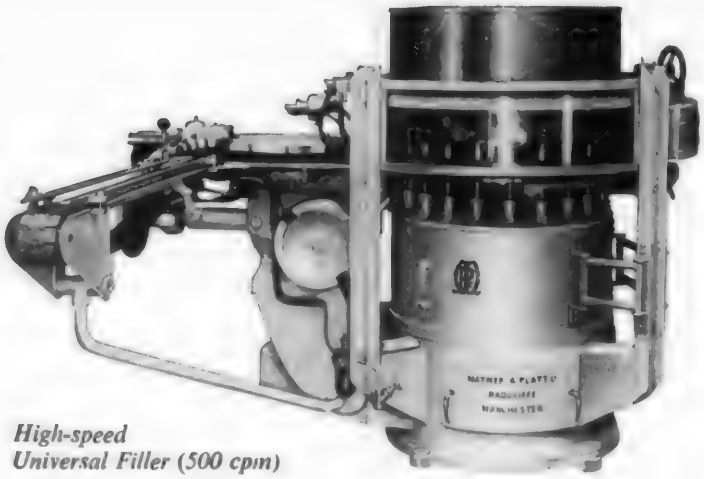
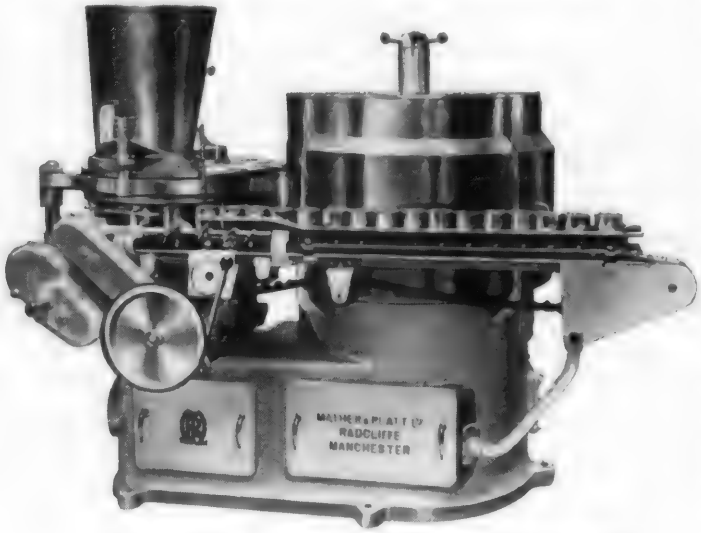


High-speed Universal Filler (500 cpm)



High-speed Solid and Liquid Filler (300 cpm)

A10 Can Filler (30 cpm)

MODERN FILLING MACHINERY

These modern machines are part of a new and complete range of designs by Mather & Platt Ltd for the canning industry.

They combine a high degree of accuracy with high speed and simple and economical maintenance.

We are exhibiting at the
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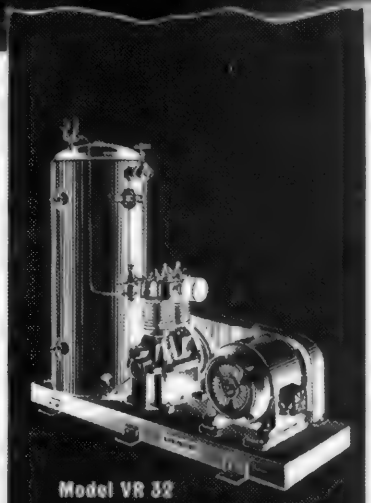
AIR POWER!

The Needles



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Above:—Ammonium Sulphate plant at Manvers Main Coking Plant, treated with Evokote Type 10
Below:—Maplewood floor treated with Evokote Type 20 at the works of John Mackintosh & Sons Ltd., Halifax

—proof against mineral and organic acids, fruit juices, steam, caustic soda, detergents, abrasions

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M-W.118

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with long life petrol or diesel power unit

BUILT with your needs in mind, the Commer 1½ ton forward control model thrives on the toughest assignments . . . triumphs magnificently over the fierce strain of "stop-start" delivery work. A sterling example of Commer reliability, this lively four-cylinder model is quality engineered and gives the utmost economy of operation. Primarily fitted with van bodywork distinctively modern in style, the chassis also accommodates special bodies to suit individual requirements such as the above.

Built stronger to last longer!

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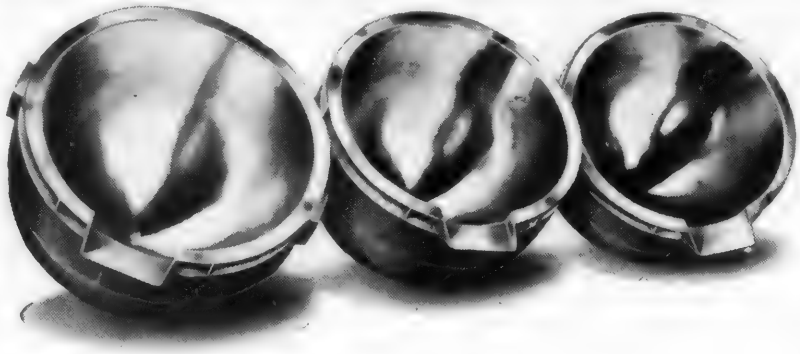

BUTTERFIELD

STAINLESS STEEL PLANT

Illustrated above:
A row of Stainless Steel Jacketed Pans for a series of Tilting Pans

And on the right:
1,000 gallon Stainless Steel Cream Storage Tank for 'Ambrosia' Ltd.

Butterfield craftsmen meet the ever expanding demand of the Food Industry for Stainless Steel Equipment with precise compliance to specification and with a very high standard of finish

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We also fabricate in Mild Steel Aluminium and Nickel

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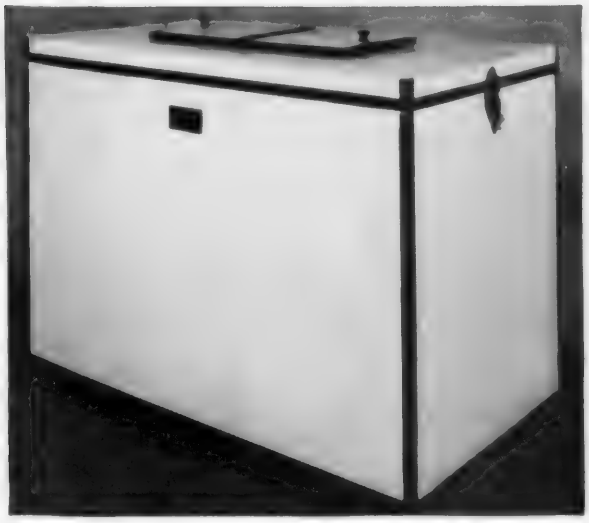
Conserve ice cream with 'Darvic' p.v.c. sheet



Hold-over cabinets for conserving ice cream faced with 'Darvic' and made by Alexander Battye (Battifreeze) Ltd., Leeds.

HOLD-OVER CABINETS for conserving ice cream made by Alexander Battye (Battifreeze) Ltd., Leeds, are faced with 'Darvic' p.v.c. sheets.

'Darvic' is an ideal material for use with food because it is absolutely hygienic; it will not taint food or drink and is completely odourless. 'Darvic' is easy to shape and is widely used in the manufacture of refrigerators and refrigerated cabinets. 'Darvic' is an excellent material for one-piece shapings for refrigerator interiors and it is used for making crisper trays and a wide range of other components.

'Darvic' has many outstanding properties, among which are high impact strength, resistance to corrosion and low thermal conductivity. It is a light material, but tough, and is rigid even in thin sheets.

A range of attractive colours is available which includes multi-colour laminates.

'DARVIC'

'Darvic' is the registered trade mark for the rigid p.v.c. sheet made by I.C.I.

IMPERIAL CHEMICAL INDUSTRIES LIMITED · LONDON · S.W.1

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A.C. DIRECT-ON-LINE
CONTACTOR STARTER
WITH ISOLATING SWITCH

Up to 5 h.p. 200-550 volts 25-60 cycles

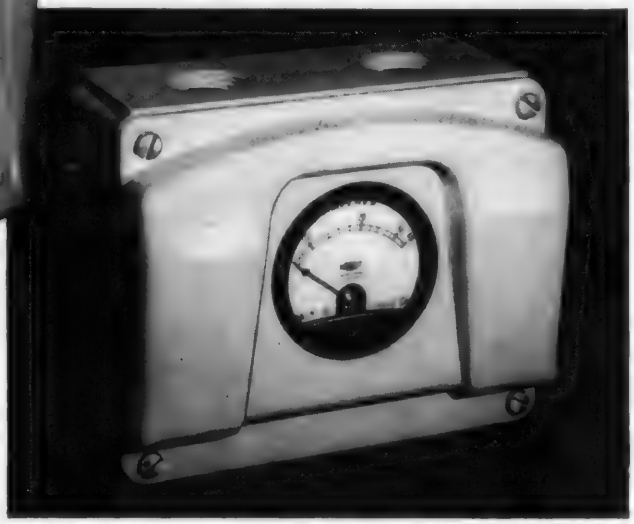
For three-phase or single-phase non-reversing squirrel-cage induction motors.

Type DOC 71

These well-established contactor switch-starters are now available fitted with mechanically interlocked three- or five-pole isolating switch. An ammeter unit and/or HRC fuse unit can also be accommodated in addition to, or in place of, the isolating switch unit.

The isolating switch can be supplied as a 3-pole 'on-load' switch rated at 30 amperes maximum (tested to break 100 amp. at 440 v.), or alternatively in 5-pole form with three main 30-amp. poles plus two normally open control-circuit auxiliary poles.

The starters comply in every respect with BS587, 1957 for 'Frequent Duty', i.e. forty starts per hour.



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INCORPORATING THE MOTOR & CONTROL GEAR INTERESTS OF BTH & M-V

A5450

North-of-the-Border bottles

THIS is such a peculiar factory. All they make is bottles—and they're all empties. Full of nothing but air. But at least it's Scottish air. Yes, they're all Scotch bottles. No, not just whisky—bottles for everything. All made by Scots out of Scottish glass right here in Alloa. They're native, home-blown, North-of-the-Border bottles one and all. Scots, wha hae!

The Alloa Glass Work Company provides a first-class, on-the-spot glass packaging service. You get individual treatment. There are excellent design and research facilities. And the Alloa Company has an associated closure company—also in Scotland. Please get in touch and see how Alloa can help in *your* business.

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when your product begins as a formula...

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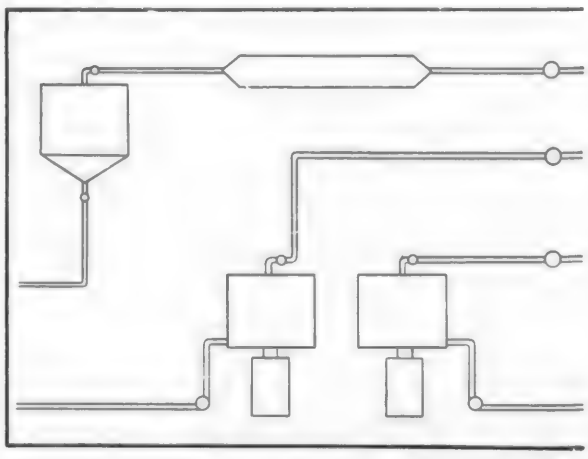
FIRST YOUR FORMULA. It was born in your laboratory out of hard thinking, patient work and hopeful spending. Now it is ready to be turned into productivity and profits. Now speed comes into the picture; speed and volume. It's going to be thousands of gallons now, not pipettes full. Yet it has all got to be as precise in the factory as it was in the laboratory. Clearly a matter of measured batch dispensing and blending; a problem of process control.

THE AGE OF AUTOMATION

This was the picture we at Measurement had in our mind's eye when we were working on the Measurement *Automatic* Liquid Process Control system. Industry, we knew, would want accuracy and speed, and a modern way of applying it. An up-to-the-minute way. In this modern age the bucket is out, mainly because it excludes accuracy. Lifting and trucking must be eliminated because firstly it results in hold-ups, secondly in a waste of labour, and thirdly fatigue with its resulting fall-off in rate of production. Our equipment aims at automatically dispensing the right quantity to the right place at the right time, with all the necessary indication and records made automatically en route. The age of automation inspires sound business men to ask for the right installation for the job and no making shift. Control is the keyword.

"Backed by our years of experience", as the advertisements say (for we have been making liquid meters, pumps and electrical control apparatus for a very long time), we set about meeting this challenge. Years of research finally produced



the instrumentation that offered the flexibility which is essential, and the standardisation which makes the system an economic proposition for industry.

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Today Measurement equipment is used in handling a large number of liquids in food manufacture, paper making, oil blending and chemical mixing processes. Liquids handled range from condensed milk to caustic liquors, and from benzine to beef dripping, and at Measurement Limited there is a catch phrase, "If it flows in a pipeline, then we can meter it".

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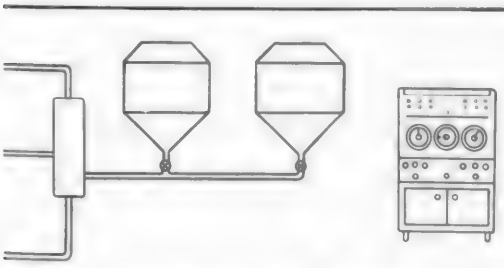

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(g) Meters with automatic presettable indicators that enable the operation of valves, pumps and warning devices.
(h) Complete panels with auto preset indicators, signal lamps and push buttons for wall mounting or free standing.
(i) Schemes involving a number of meters dispensing liquids to one outlet.
(j) Schemes where a number of liquids are dispensed through one meter.
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(l) Complete panels incorporating mimic diagrams.
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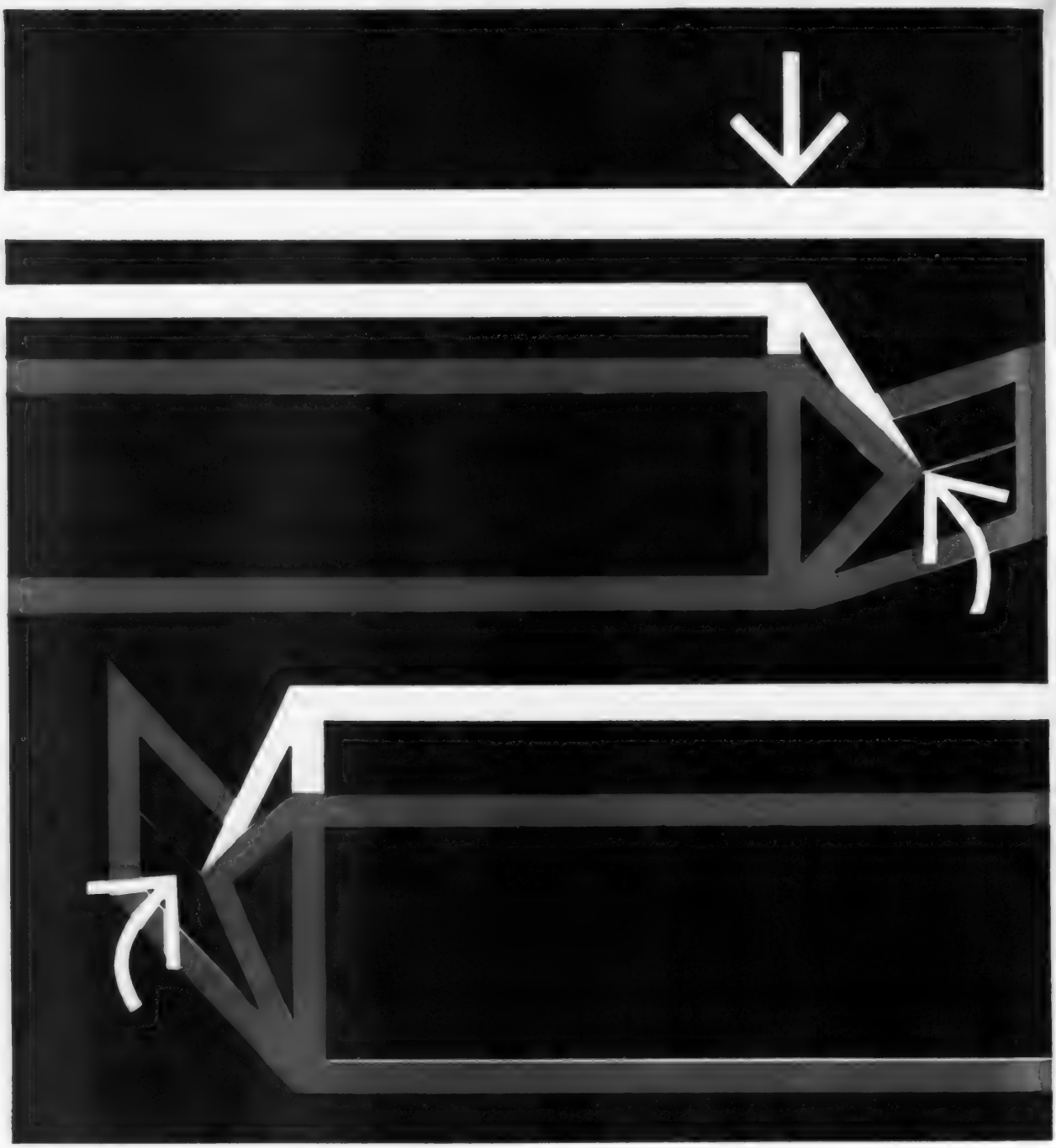

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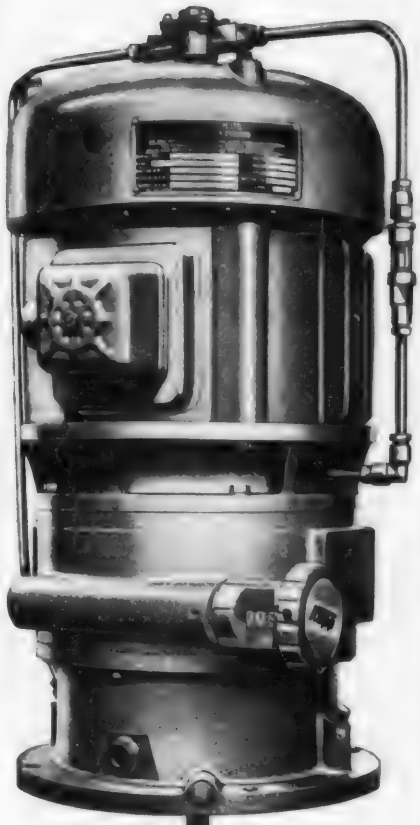

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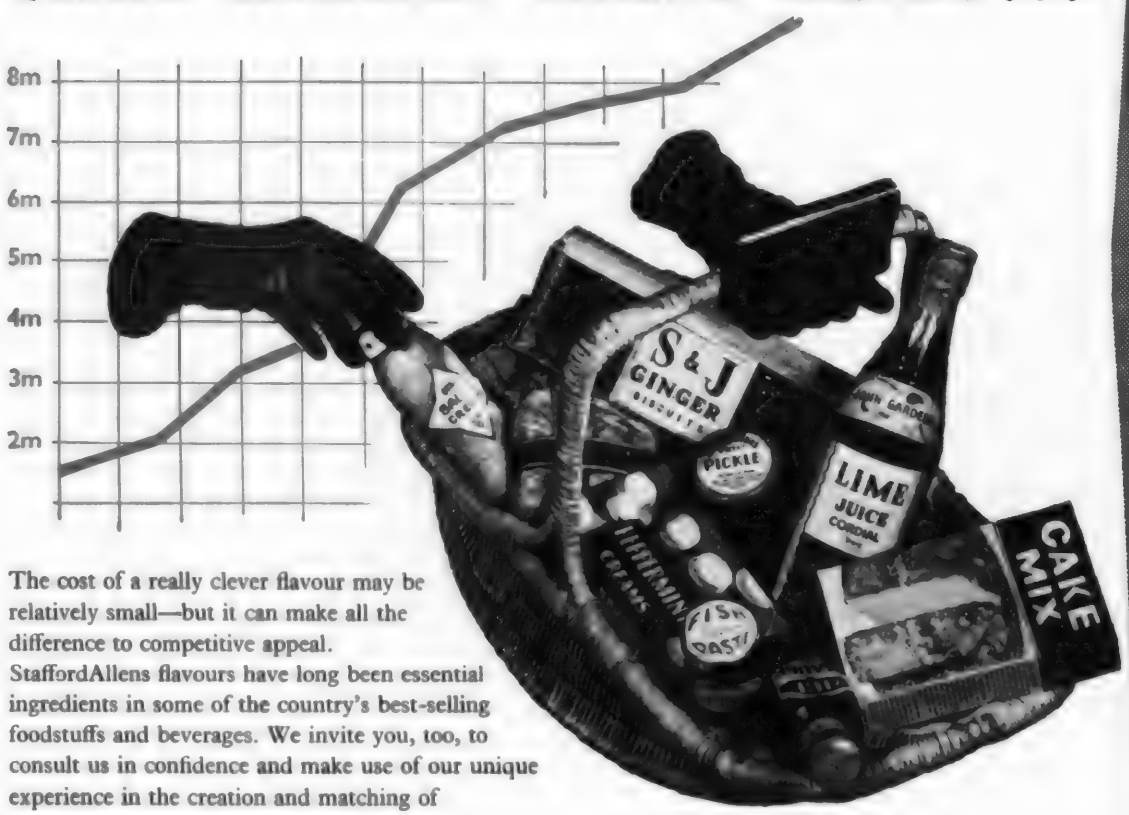

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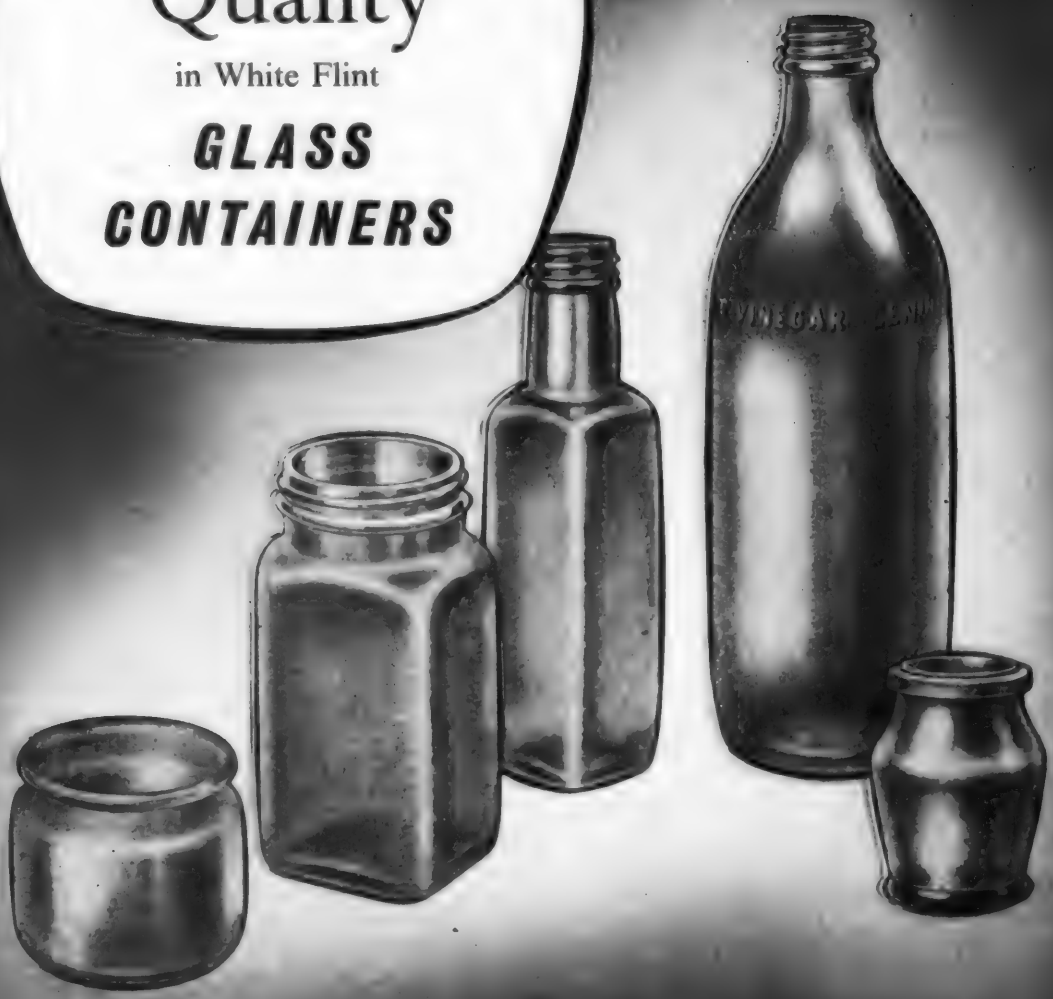

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FOOD MANUFACTURE

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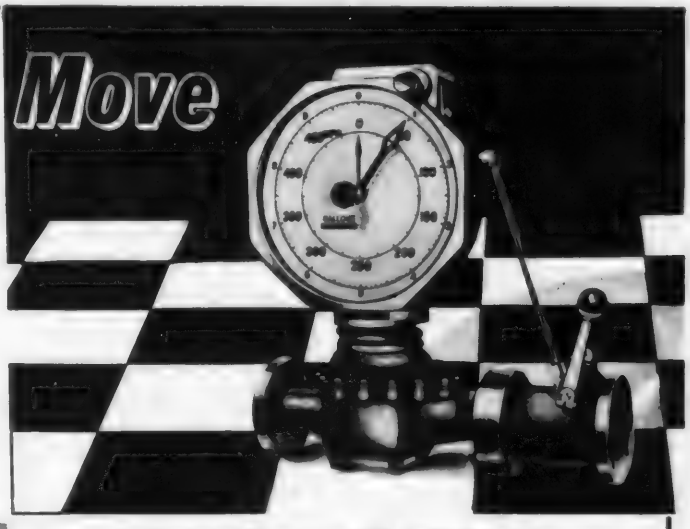

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FOOD MANUFACTURE

Vol. XXXIV, No. 8 August 1, 1959

Flare up in sausage war?

A CORRESPONDENT writes that the Government departments, local authority associations, and other organisations concerned in the great sausage battle have seen little fighting lately, it is expected that action on a wide front will take place soon. The fight is over what a sausage should have under its skin and whether these ingredients should be set down in black and white as a code of practice.

The temporary lull in hostilities was caused by Mr. John Hare's brief appearance on the battleground. As Minister of Food he declared that, despite the recommendations of his expert Food Standards Committee, he had decided not to put in writing what a sausage should contain.

It was recalled then that the committee, in a majority report, had recommended that the addition of up to 20% of meat other than named meat, should be permitted. But a minority had recommended that sausages should not be allowed to contain other meat in any proportion. The Minister declared that the majority recommendation would be unenforceable, because there was no known method of determining the proportions of beef or pork and other meats in a sausage.

The minority recommendation, on the other hand, would conflict with the long-established custom of the trade.

Then, when it was expected that the battleground would echo with calls of "retreat" and "cease fire," the executive committee of the County Councils Association stirred up their forces for a further assault. Although left to get on with it by other municipal organisations, the committee advised the Minister of its dissatisfaction. It pointed out that his decision took "no cognizance" of the suggestion that had previously been put forward—that the standard should prescribe a meat content only, of 65% for pork sausages and of 50% for beef sausages.

Now another assault is planned. County public control chiefs are reporting a decline, in some areas, of sausage qualities and of the need for more protection for the buyer. "We are girding our loins for another go," said one county food and drugs official. "It is a serious business."

Eat more grass

THE use of grass as a human food is not as far fetched as it may appear. It may not be generally known that when pellagra, caused by vitamin B_2 deficiency, threatened death and permanent blindness to many thousands of prisoners of war in Singapore, the large-scale production of grass juice from Lallang, *Imperata cylindrica*, was organised. Its revolting smell was mitigated somewhat with a dash of chloroform, and after some understandable initial reluctance, this unnatural food came into such high demand as to exceed the productive capacity of the grass factory. About half the prisoners drank a pint a day with, not exactly pleasure, but certainly with avidity. The result was that the eyesight of the Singapore prisoners was better than those of any of the prison camps in the Far East, according to an inspecting surgeon at a military hospital in London.

One of the ways of increasing the available food supplies is by cutting down waste, and although our sensibilities are rather affronted at the thought of regarding the homely cow as a protein producing machine, its efficiency in this respect is somewhat low, taking into account the amount of pasture it consumes. Grass may be fractionated into its components by pulping and coagulation. In this way, proteins, fats and starches can be separated as food for man, amino-acids, sugars and salts can be coagulated and used as a medium for the growth of micro-organisms, whilst the fibrous residue can still be used as a fodder for ruminants and as a substrate for microbial fermentation. Leaf proteins in various forms—biscuits, ravioli and solvent extracted powder—were demonstrated to an audience a little while ago, but unfortunately our informant did not tell us the reaction of those who sampled these unusual foods.

The thin line between . . .

SOME concern is being felt in those countries where olive cultivation and the production of olive oil are carried out, over the 1959-60 olive crop. If there is an abundant olive crop, and the signs at the moment are that the world crop will provide a surplus, then

there may be serious anxiety among agricultural producers and industrial and commercial people in both the olive and seed oil industries. In the 1958-59 season, olive oil production fell from that of the year before and the year was a poor one for olive oil producers, according to Dr. G. Coppola, director of the Italian Association of the Oils, Fats, Soaps, and Allied Products Industry.

Dr. Coppola, who was speaking at the 37th annual congress of the International Association of Seed Crushers held at Cannes at the beginning of June, said that "In almost all the oil producing countries, State intervention for the protection of olive growing has become permanent, thus emphasising its considerable importance."

Dr. Coppola went on to say that the olive growing countries, such as Italy, where there is also a seed oil industry already know the precariousness of times when it is impossible to make plans, or to operate mills at a reasonable level of capacity and at such a margin as to give peace of mind to growers, processors, and traders.

Surely it is an accepted fact in every sphere of operation where one is dependent on Nature for the harvest that there is a very great risk. Dr. Coppola seems to have caught on to a habit comparable to the English one of discussing the weather and grumbling about it at every opportunity for he apparently contradicts himself by saying that 1958-59 was a poor year with a disappointing crop, and that 1959-60 will cause considerable anxiety if there is a surplus. Perhaps Nature should make use of a slide rule.

Puzzle corner

THE daily flow of documents through the editorial office is a river of such magnitude that sometimes we may be excused for showing symptoms of literary indigestion. Press reports of every kind are mingled with communications from Government departments, whose intrinsic interest and readability are not always their outstanding merit. Occasionally, the hypnotic state induced by the effort of ploughing through this endless stream of paper is dispelled by something that is different. The little piece of paper that came into our hands the other day was, in appearance, not one whit different from any other press notice from the Board of Trade. "Application for exemption from duty of liquefied herrings," we read. We stifled a yawn. "Liquefied herrings." What were liquefied herrings? Had we misread? The veil of languor was melting away; these two little words, so commonplace yet so incongruous in their juxtaposition, seemed to be calling derisively from the pile of press reports. We read the notice again. "The Board of Trade give notice that they are considering an application for the exemption from import duty of liquefied herrings." There it was in black black and white. Should we know what liquefied herrings were? Fearful less our ignorance should be ridiculed, we furtively enquired of our colleagues. To our relief, our ignorance was not unique; no one seemed to know what this unappetising product was. We telephoned the Board of Trade. The only information they could offer was that it was a "liquid made from herrings." Where was it imported from? They could not say. We tried the Ministry of Agriculture, Fisheries, and Food; the reaction was more hilarious, we distinctly heard girlish laughter in the background as the person to whom we spoke repeated our question incredulously. Now, dear reader, do you know what liquefied herrings are? Is it a tasty Continental dish or a form of animal feedingstuff? Is the term in common use or has it been coined by a humourless Civil Servant? We do not profess to know.

Tighten those screws

WE learn from Australia that efforts by survey officers of the New South Wales State Department of Agriculture to persuade farmers to adjust their milking machines properly are reaping dividends in the amount of extra milk obtained and in the extra profits accruing to the farmers. Many faults discovered had been causing dairy farmers considerable and unnecessary losses. A department official recently said that the milking-machine efficiency survey had been one of the most important contributions to the dairy industry ever made in the State, and the monetary value gained could not be estimated. An instance was quoted of a farmer whose machine before attention was milking 39 cows in the hour and taking from them 60 gallons of milk daily. A month after the recommended adjustments were made, the machine was milking 44 cows an hour and obtaining 78 gallons per day.

We wonder what the results would be of a similar survey in this country. Machinery which is functioning poorly frequently needs only a minor adjustment to bring its performance up to scratch, yet how often are such adjustments neglected. Equipment which is carefully maintained lasts longer, functions more efficiently, and costs less than that which is not, yet so often vital machines are allowed to operate for long periods with inadequate maintenance.

Printing dispute

THE dispute in the printing trade has compelled us to produce an abbreviated issue. Some articles and features have had to be held over; we apologise to our readers and contributors and beg their forbearance in a situation over which we have no control.

I.C.I.'s Food Colours Plant at Huddersfield

Quality, not quantity, the keynote of the "Edicol" range

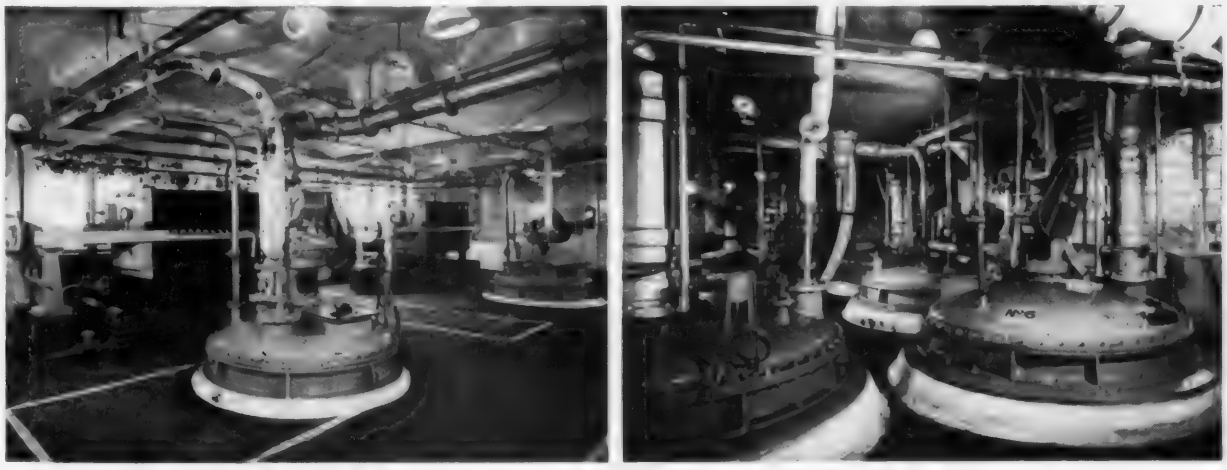
At the Dyestuffs Division's works at Huddersfield, FOOD MANUFACTURE recently saw the strict manufacturing and analytical control to which every batch of "Edicol Supra" food colour is subjected.

THE use of synthetic colours in prepared and processed food is now a universal and established practice. The natural colouring matters of many foods are impaired during processing, and public taste demands that these colours be restored to their original shade. In that very important quality known as "palatability," appearance, as well as smell and taste, is concerned; with many foods certain colours are associated, and if his peas are not green nor his strawberry jam red, the consumer will regard these foods with an unfavourable eye.

Vegetable colours were widely used in the past, but many of these had low colouring power and were neither very stable nor of uniform quality. Neither did it follow that a colour of vegetable origin was necessarily harmless. Intensive research coupled with rigidly controlled manufacturing methods has now provided the food manufacturer with a wide range of high quality synthetic colours suitable for a very large variety of products, and for this reason nearly all the colours now in general use are synthetic.

In most countries of the world, the artificial colouring of food is controlled by government regulations designed to ensure that the colours added shall be harmless and that no deception as to identity or quality shall be practised. Unfortunately, regulations vary rather widely from country to country, although nearly all are now based on a restricted list of permitted colours, only colours on this list being permitted for use in food. In the United Kingdom, the situation was brought into line in June 1957, when a permitted list of about 30 colours was approved by government decree; before that, the regulations merely prohibited the use of certain colours which were known to be harmful.

It is the claim of Imperial Chemical Industry's Dyestuffs Division that the regulations in this country were anticipated by several years in their range of *Edicol Supra* colours for foodstuffs, which since their inception have been made to conform to specifications which often were considerably more stringent than those decreed by government regulation. At the outset, it seemed to some that this deliberate policy of a self-imposed discipline more severe than was actually necessary was unduly cramping, but events have amply vindicated I.C.I.'s foresightedness, for they are now in a position to offer colours which not only comply with the various regulations in force throughout the world, but which in many cases conform completely to the general and individual specifications laid down in the Food, Drug and Cosmetic regulations of the U.S.A.; and batches of these colours certi-



(*Left*): **The top floor of the food colours plant, showing some of the reaction vessels and the screening presses.** (*Right*): **The reaction vessels on the top floor discharge into these reaction tanks on the floor below.**

The ground floor of the plant. (*Left*): The pressure vessels in the background, which discharge the finished product to the filter presses, one of which is seen in the foreground. (*Right*): The atmospheric dryers can be seen in this picture.

fied by the U.S. Federal Authority in accordance with the pre-testing regulations now in force are available.

Historical

I.C.I. was formed in 1926 as a result of a merger of four British chemical companies, British Dyestuffs Corporation, Ltd., Brunner, Mond and Co., Ltd., Nobel Industries, Ltd., and United Alkali Co., Ltd. It is the largest manufacturing company in Great Britain, employing about 110,000 people in approximately 100 factories. The Dyestuffs Division operates 8 factories, the largest of which, at Huddersfield in Yorkshire, makes among many other ranges the *Edicol Supra* range of food colours. The Dyestuffs Division claims direct descent from the firm of Perkin and Son, founded in 1857 by W. H. Perkin, the discoverer of the first synthetic dyestuff. The Huddersfield works was established shortly after the start of the first world war to supply the dyes formerly obtained from Germany. Although the first synthetic dyes had been discovered by British chemists, Britain sadly neglected the development of these discoveries in the days before 1914, and it was Germany which at that time led the world in the production of dyes, chemicals and pharmaceuticals. By the end of the war the position was vastly different. The merger of Levinstein, Ltd. with British Dyes, Ltd. in 1919 to form British Dyestuffs Corporation, Ltd., made it possible for the British dyestuffs industry to compete effectively in world markets, and the further merger in 1926 placed the British chemical industry in a position powerful enough to compete with Germany's reviving strength and with the growing American chemical industry.

Manufacture of "Edicol" colours

In comparison with the total output of dyestuffs, the tonnage of edible colours for food is, of course, relatively small, and the separate plant in which *Edicol Supra* colours are made occupies only a small part of the 250 acre Huddersfield site. Nevertheless, the importance of these colours is in no way proportional to their scale of manufacture, and even if production is measured in individual tons per year instead of hundreds, the care taken in manufacture and in quality control is impressive, as indeed it must be. At the back of the actual production is, of course, the Division's research establishment at Blackley, Manchester, the largest organic research organisation in the British Commonwealth, which employs a staff of nearly 700, of whom 250 are graduate scientists.

The plant occupies three floors, and process movement is from the top downwards, mainly by gravity. On the top floor are some rubber-lined mixing tanks and filter presses which are used for filtering solutions in process as required. All raw materials are delivered to this floor by lift.

On the floor below are the coupling tanks, also rubber lined, in which are carried out the manufacture of azo dyes. Of the sixteen different colours made in this plant, nine are azo dyes. The connections between the tanks on the top floor and those on the floor below are by means of flexible rubber hose, allowing different tank combinations to be used. The tanks are fitted with electrically driven slow speed stirrers. Many coupling reactions require ice cooling, and for this purpose ice is obtained from the central refrigerating plant which supplies the whole of Huddersfield works with ice or cooled brine. On the ground floor are the storage tanks, enamel or rubber lined, which discharge their contents under pressure to filter presses on the same floor. The filter presses are of the multiple frame type and filter off the precipitated dyes from the reaction liquors. After filtration, the filter presses are opened and the filtered dyes emptied on to trays. At this stage their moisture content varies according to the type of dye, and may be as high as 50%. The moisture is removed by drying in atmospheric steam-heated dryers, each of which has a capacity of about 2 tons depend-

(*Concluded on page* 317)

Problems and Trends in the Fish Industry—II

By C. L. Cutting,* B.Sc., Ph.D., F.R.I.C.

In the concluding part of this review, the author shows that in spite of the difficulties with which the industry has to contend, these can be overcome by the use of better techniques of refrigeration and storage, and reorganisatian of distribution and education.

THE prevailing system of auctioning and distribution by hundreds of firms at the major ports is an obstacle to thorough rationalisation. Possibly structural changes in the industry caused by reorganisation of distribution may favour such development in the future.

During unloading, fish taken out of ice is frequently exposed in containers (either round "kits" or box-shaped "trunks") on the fish market for some hours before sales commence at about 8 a.m.

A recent survey of nearly 30,000 temperature measurements of fish in commercial distribution in summer has shown[11] that whilst the temperature of fish coming out of the trawler is mostly 32°F., it can rise to 52°F. at the top of a kit on an average summer's day by the time it is sold. Even at 4 p.m. in the afternoon between 100 and 200 tons of fish can at times still be seen standing without ice in containers on the market awaiting filleting, etc.

The average temperature of fish prior to filleting in the afternoon is 44°F. and some fish is above 60°F. with correspondingly enhanced spoilage rates. More expeditious handling and the use of ice would reduce spoilage, but ice placed on top of kits only has any appreciable effect on fish with which it is usually in contact. Thorough admixture of ice is essential for quick and efficient cooling.

When white fish is filleted, as much of it is, whether at the market or at the fish merchants' premises off the dock, it is usually first "washed" by being tipped into a trough of water. Quite apart from the dubious character of such cleansing (which will be considered in the next section) the temperature of mains water is usually around 50°F., and the average temperature of fish after filleting therefore, approximates to this. After filleting the fish should not be allowed to remain long without ice. Fillets in 2-stone boxes usually have ice spread on the top only. Fish is a poor conductor of heat and it may take 10 hours before the fish at the bottom is cooled to 35°F. even if sufficient ice is used for the purpose[12].

Some fish arrives at the railway terminus at a temperature as high as 50°F. Better distribution of ice through the fish, and more of it, is essential if it is to arrive at a temperature approaching 32°F. Present railway freight rates, which are based on gross computed weights, encourage the maximum ratio of fish to ice. In an ordinary 5/6 stone box it is standard practice to use about 1 stone of ice to 6 stones of fish in winter and at most 2 of ice to 5 of fish in summer. There is little or no adjustment for exceptional weather conditions, although the railway authorities allow free of charge a little, loose ice spread on top of boxes in the vans. In Germany, on the other hand, fish freight rates are fixed after consultation with the appropriate research department on the conditions best for the fish. In Denmark again, as much as 3 parts of ice is normally added to 4 parts of fish in summer, and 2 to 5

Dissection of cod muscle for chemical determination of cold store changes.

* Officer-in-Charge, Humber Laboratory, D.S.I.R., Hull.

in winter, and fillets are pre-chilled by immersion in iced water. It is no accident that Danish fish arrives at Billingsgate via Harwich by road noticeably cooler than most fish from British ports.

No floor insulation

Obviously for a country of short transport hauls such as Britain, the condition of fish inland depends much more on its packing and icing at the port than on the transport equipment. Nevertheless, British Railways are changing over to insulated fish vans. Preliminary tests indicate that the heat leakage is thereby reduced by only about 25%, chiefly because the floors, with which the bottom boxes come into contact, are uninsulated.* Floor icing, under duckboards, if practicable, would appear likely therefore to be more effective than either the top-icing already referred to, or the use of solid carbon dioxide. The latter is at present supplied where requested, as a railway service. An icing service similarly operated would provide a much less expensive source of supplementary refrigeration.

At the wholesale markets boxed fish is only very rarely topped up with ice before passing on. At retail shops ice is again only exceptionally used to cool fish on display, the temperature of which can reach over 70°F. in summer and in fact averages something like 55°F. before sale. Ice boxes seem at least as effective as refrigerators for holding purposes, and there is no danger of accidental freezing in the latter. Relatively few refrigerated display cabinets were encountered in the survey made in the summer of 1957 and in performance these seemed less effective than the use of ample quantities of ordinary water ice. There still seem to be problems of specification and development in design.

As a result of elevated temperatures all along the line it has been calculated that fish spoils on average as much in the 1½ days assumed between landing and retailing as it would do in something like 4 days if kept at 32°F. all the time.

It is in this context of the at present inadequate application of ice that one should assess the potentialities of various additives to ice. In the first place, the industry is widely convinced that the "quality" of ice itself varies in some way. No tangible evidence to this effect has been obtained in a recent attempt to get to the bottom of this misconception. It is suspected that uncontrolled external factors, such as atmospheric temperature and draughts are responsible, rather than real differences in the properties of ice[13].

From time to time during the past 25 years, such antiseptics as hydrogen peroxide, sodium nitrite and formaldehyde have been proposed for addition to ice the better to preserve the fish with which it is to come into contact. Recently antibiotics of the tetracycline series, particularly "aureomycin" and "terramycin" have proved very promising and have been approved in a number of countries. Poultry is already being treated with an antibiotic dip, but such a procedure with fish would obviously be difficult at sea. Incorporated into ice at 5 p.p.m. "aureomycin" can extend the useful life of fish from its present 15 days to over 20 days[14] before it becomes inedible. However it has no immediately obvious effect on the fish until it has been 8 to 10 days in ice and has therefore in any case lost its initial sea-freshness, although it is just conceivable that fillets from fresher fish so treated, might keep better in subsequent distribution through the temperature chain already described. The fish industry is very interested in the possibilities opened up by these antibiotics and has made official application for permission to use them. Point is added to this by the possibility of extension of fishing limits forcing trawlers to fish still further afield—off Newfoundland even, for example. The medical authorities are properly cautious in approving food additives. Furthermore, fears have been expressed that the possession of antibiotics by the fish industry might even lead to slackening of present standards of care and hygiene[15]. It is probable, too, that if such substances became at all widely used some form of laboratory control would be called for in an industry which has hitherto managed to exist without it.

Need for better hygiene and sanitation

Fish, fortunately, is not implicated as a carrier of food poisoning or disease organisms, other than through the normal hazards involved by human handling of pre-cooked products, such as fish fingers, fish cakes, etc. Pathogens do not multiply at the temperatures taken up by wet fish packed in ice. Moreover, the normal cooking process results in the destruction of any such organisms and their toxins. However, æsthetic considerations are also involved in competing for the custom of a consuming public that is becoming increasingly clean food conscious. Furthermore improved hygiene, with the object of reducing the risk of food poisoning, goes hand-in-hand with better sanitation, with the object of minimising loss of quality due to contamination of fish with normal spoilage bacteria[16].

A beginning has been made by industry on the trawler, where a simple pattern of fish washer has been widely adopted in the last few years, as much as anything because of its convenience in instituting a rudimentary production line aboard ship. Fish slime, in addition to harbouring copious numbers of fish spoilage bacteria, is tenacious material, and can only be removed by a combination of suitable detergents, vigorous scrubbing and disinfectants. The surfaces of wooden fittings, shelves, containers, etc., cannot be satisfactorily freed from bacteria, and wood is still too often used, although metal is beginning to replace it in some instances. Various plastic coatings that are being introduced seal up the pores into which organisms can penetrate, and in such cases of soiling,

* Rectified since this was written.

(*Left*): **Members of a taste panel judging the quality of raw and cooked fish.** (*Right*): **Assessing the quality of market fish by an experimental test paper technique.**

in addition to being lighter, is less tenacious. However, fish rooms and pound boards are often given only a perfunctory wash with cold water without detergents or sterilisers.

On the market fish often touch the market floor, which can be anything but clean, and returnable fish boxes are not always effectively cleaned before re-use. Metal fish kits, although washed mechanically, develop a build-up of dried, brown slime which is unsightly, even if it does not add materially to the bacterial counts of a distant water fish. One or two of the more enterprising fish-merchanting firms use detergents and chlorinated water for cleaning equipment and mechanical jet fish-washers in preference to the normal wooden filleting trough, in which a heavy bacterial count can build up, particularly if the water is not continuously replenished. With filleting and skinning machines which incorporate flowing water becoming more widely adopted one source of contamination will be avoided, because it is at present difficult to see any other alternative to uncoated wood for use as a hand-filleting board.

Wooden non-returnable boxes are replacing returnables, not so much on account of concern for hygiene as because of the difficulties in recovery combined with the expense of transporting returned empties. These non-returnables, being more flimsy, are more easily damaged, to the detriment of their contents, with resulting financial loss. An attempt has been made to develop a moulded pulp container with a high degree of wet strength, which holds out the prospect of being both cheaper and stronger than the non-returnable wooden box[17] but the early promise of this project has yet to be fulfilled.

There are technical problems to be faced and solved if fish is to be retailed under the most hygienic conditions, quite apart from the question of temperature control already referred to. Fish handling is inevitably a wet and messy business. More thought seems to be needed at the design stage to ensure that the shop when built is capable of being operated in such a way that it can be kept clean and free from flies.

In this connection one interesting recent development which has now spread to the fish industry is the sale of prepackaged food at self-service stores. The hygienic advantages of packaging to prevent contamination of food in the shop are obvious, but it is unlikely that from the sanitation aspect, the rate of spoilage of fish from natural causes is affected at all favourably. The effectiveness of temperature control during processing and distribution will, as may be gathered from the previous section, be the factor determining the success or failure of prepackaging as applied to fish. On the other hand, if prepackaging really makes possible protection of a brand name by proper attention to quality and distribution conditions it may well succeed in partially ousting the ordinary fresh fish trade where control of time and temperature are more haphazard.

Freezing of fish

It has been established that only if fresh fish is really fresh, rapidly frozen, glazed to minimise the effects of desiccation and oxidation, and then stored at temperatures of around −20°F., can it be kept without significant loss of quality for, say, six months[18]. Before 1939, quick freezing was at one time regarded as all that was necessary and sufficient, and the importance of initial freshness and cold storage temperature was rather overlooked by industry. Although Torry Research Station has, for over 20 years, been advocating the use for fish of much lower cold storage temperatures than are usually regarded as satisfactory for meat, only recently has this standpoint been widely accepted. Several large stores recently erected or planned in Hull and Grimsby, and the Herring Industry Board's new store at Stornoway and its soon to be converted one at Lerwick, will considerably increase the total

storage capacity available at −20°F., thus providing more extensive means of marketing high quality frozen fish. However, complementary realisation of the importance of really fresh fish for a first class product is not yet so widespread.

There has been considerable post-war development in fish freezing, which now affords the largest single outlet for processed fish, but most of the advance has been in the field of consumer packs. Although these are relatively expensive partly on account of the handling and packaging involved, many people are prepared to pay more for a product of a high and reliable quality, which is not subjected to the vicissitudes of normal retail handling already referred to. However, there may be a limit to the sales of fish in this form. Moreover, if demand continued to increase, there would be difficulty at the ports in supplying white fish—although not herrings—of the desired freshness, dependent as we are on supplies from distant fishing grounds. Only if freezing is applied earlier along the distribution chain, *i.e.*, before arrival at the port, will the potentialities of the process be fully realised. As described in the previous section, some distant water fish is on or over the borderline of edibility by the time it reaches the port, and even the very freshest is normally about 5 days old. But the staler fish is, the more susceptible it is to cold storage deterioration. If cod 1, 2, 3, 4, etc. days in ice is frozen and kept at −20°F. for a few months there is quite a noticeable gradation in appearance on thawing out, fish more than 3 days old giving a product distinctly inferior to that from fresher fish[19]. The essential technical problem of the British white fish industry is how to bring home this distant water fish (perhaps becoming even more distant as time goes on) in really fresh condition, and as has already been pointed out antibiotics can only provide a partial solution. If freezing is to be the solution it will have to be carried out close to the fishing grounds. The northern countries will obviously possess advantages, and in connection with the recent dispute over the extent of territorial waters it has even been suggested that British trawlers might make use of freezing plants in the north of Norway that are at present not used economically[20].

Factory trawlers

Floating freezing factories, acting as mother ships supplied by fleets of catching vessels, landed Greenland halibut in Hull in the late 1920's and early 1930's[21], but this procedure has not been revived, partly because transhipping fish is difficult and dangerous in bad weather in the open sea. Since the war a specially built freezing factory trawler (the *Fairtry*), which catches and processes its own fish has been developed in Britain[22], and widely adopted in Russia[23], where there is perhaps less hindrance from the inertia of an established pattern of fish distribution.

For Britain, however, where fish consumption is not expanding, a wholesale swing-over to factory trawlers of the *Fairtry* type would imply the obsolescence of the modern distant water fleet now numbering some 250 vessels, each of which would cost over £200,000 to replace in their present form. With this in mind an investigation has recently been made into the possibility of converting a distant water trawler to the freezing of a proportion of its present catch[24]. Named after the ship on which the attempt was made, s.t. *Northern Wave* of Grimsby, the experiment was technically a success. The distributive trade, applying traditional criteria of quality, were able to make certain criticisms, as they are also of *Fairtry* fish. However, most who tasted it, including retailers, fish friers and consumers, agreed that the flavour of the product was really excellent. Although processing and cold storage charges are incurred in this procedure, the financial return needs to be considered in relation to the entire operations of the trawling fleet, including sales of unsold fish at uneconomic prices for fish meal, etc. By diminishing the need for high speed return from the grounds, substantial savings in fuel could be effected[25].

The *Northern Wave* froze whole fish which had to be thawed out, but could then be handled by the port fish trade in the normal way. The *Fairtry* mostly freezes fillets which go straight to the processor and caterer. The full implications of successful freezing at sea in an integrated fishing industry are difficult to predict. The attitude of the distant water trawler owners was summed up at a conference last year as "the trade has got to accept the necessity for freezing and ultimately for freezing at sea."[26]

In the herring trade, which is to a large extent, separate and distinct from the white fish industry, freezing could again play a crucial role. The main technical problem is to smooth out the annual fluctuations in supply and quality so as to maintain an all the year round industry in an era of full employment. Pre-war the industry was still largely migratory, following herring round our coasts with a more or less close season in winter and spring when supplies were variable and initial quality often poor. To-day, such indifferent herring are eagerly sought after to keep staff and factories of kipperers, etc., employed. Norwegian brine-frozen herring, which are imported to help fill this gap, are frequently rancid in flavour. If stocks of properly frozen herring could be laid down when at their best sufficient to satisfy processors all the year round at an economic cost, the quality of the article on sale would be greatly improved. One difficulty is the high labour cost of existing processes of freezing, whether by plate contact or air-blast. The vertical plate freezer developed for freezing white fish on the trawler,[27] where careful hand-packing of the fish was equally out of the question, is being adapted to the freezing of large blocks of herring, suitable for processors. In this way it is hoped that freezing can be applied economically to the mass production of cheap and

(*Left*): **Frozen fish in cold store at Torry Research Station.** (*Right*): **Vacuum freeze drying of cod fillets.**

plentiful species, instead of being applied, as it is chiefly at present, to the presentation of a consumer pack.

The Russian contract early last year for 6,000 tons of frozen fillets of cod, etc., added to considerable sales abroad of frozen herrings and kippers means that exports of fish are once again becoming important, although still far below what they were in the hey-day of the salt herring trade. Such contracts usually involve a specification of quality and therefore the need for more organised attention to the maintenance of the required standard.

Freezing is a technical operation that demands technical control and supervision of the process of an order not as yet envisaged by the industry if its product is to be consistently good. Some evidence is accumulating to show that, in spite of the general acceptance of the need for cold storage of fish at −20°F., performance may in fact fall short of intention. If not frozen down to −5°F., as specified in the Herring Industry Board's Quick-freezing and Cold Storage Rules and the White Fish Authority's Code of Practice, or if not glazed at once, or if the glazing water is too warm, frozen fish can enter cold store relatively warm. Then, if closely packed, it may be some weeks before it takes up its nominal temperature.

There are no signs yet of any steps towards the adoption of "jacketed" cold stores, now being experimented with in Canada and Russia, which promise to improve storage conditions by minimising moisture loss without increasing costs, as insulation might well be economised[28].

Fish smoking

Although freezing has now supplanted smoking as the major processing industry, the problems of fish smoking are perhaps greater than those facing any other section of the industry. After a post-war boom, consumption of both kippers and smoked white fish declined until it is now at a guess possibly something like half that of pre-war.

The method of smoking by hanging fish over smouldering sawdust fires in a chimney is little short of neolithic. The performance of traditional kilns little different from those which were used in the Middle Ages for the prolonged smoking of such products as "reds" is indifferent and erratic in producing the milder cured kippers and finnans of to-day. The Torry mechanical kiln[29] devised just before the war, satisfactorily meets the need for some control over the process, and facilitates the institution of proper production lines. It, together with more than one imitation, was adopted by a number of firms during the post-war boom when, partly owing to food shortage, practically anything could be sold. When demand fell off, some of these firms encountered difficulties, partly because their product was not always above reproach for reasons which had little to do with the kiln.

There has recently been a significant revival of interest, particularly on the part of some of the larger firms, and if for no reason other than ease of operation it seems likely that the days of the traditional kiln are now numbered, and in, say, 20 years' time they may survive only as relics.

However, it is all the more important with a mechanical kiln to pay attention to quality of the product. On the other hand, only with a mechanical kiln is it possible in any real sense to exercise a measure of control over quality in so far as it can be attributed to the curing process. Specially close scrutiny is necessary in the case of smoked fish because the use of dye hampers appraisal of freshness and degree of cure by appearance. Moreover, although some leading firms of white fish smokers use only top-grade fish for smoking, others again regard smoking as a process for preserving fish that might otherwise reach the consumer in extremely poor condition and so even when cured reaches him as a very indifferent product.

In the case of kippers, the industry has now been located, for the reasons discussed above, at a comparatively few centres, of which Hull is one of the chief. Overlanding and imports sometimes result in the use of inferior raw materials and there can be other factors, such as excessive delays in the factory before or

after kippering, which lead to loss of quality. Anxious that steps be taken to maintain and improve quality, the leading kipperers asked the Humber Laboratory two years ago to institute a quality grading scheme in Hull[30]. This was successful and has resulted in the Herring Industry Board assuming responsibility for an extension of the scheme to the entire industry.

Quality control

Quality control, in the strict sense in which it is employed in some sections of the food industry, has not yet made any appreciable impact on the fish trade of this country, which mostly still regards lack of customer complaints as its index of quality, although this is not the case in North America[31]. Obviously large firms should maintain their own quality control systems, but as yet few even of the largest British firms have the outlook, personnel and facilities required for full statistical control of production. Nevertheless, there are signs that a change in attitude is taking place. In this interim period the kipper quality assessment scheme mentioned above may well prove a useful pattern for co-operation between a technically backward industry and D.S.I.R. scientists in laying down agreed reasonable standards of quality.

In Canada, where the various Government research and administrative services to the fish industry are much more closely integrated than is the case in Britain, a government inspectorate of several hundred is maintained, providing at least one full time inspector for each processing plant, to enforce standards of quality agreed as reasonable by both research people and industrialists. These standards are understood to be much stricter than could at present be operated over here An experimental scheme recently instituted at Hull is a hopeful sign of an awareness of the need for better control of quality at the port. A panel of fish merchants assesses independently the quantities of fish from each ship which are considered unsuitable for normal use, quite separately from the normal public health examination for fitness for food.

The next immediate step forward would appear to be to bridge the gap between the research scientists and industrialists so as to thrash out a better scheme for quality control at the port. This would probably be based, as in Canada, on inspection of the raw fish on the market, backed by laboratory analysis, supplemented possibly by any objective quick market test that can be devised along the lines of the methylene blue test used for milk.

Surplus fish

One problem facing the fish industry is the fact that not all the edible fish landed are bought for human consumption. Something like 10% of the catch is diverted to various other uses, such as pet food and animal feeding meal. The latter one provides the largest single outlet for British caught herring in a good season, whilst as much herring goes into pet food as is consumed as kippers. The meal and oil outlet for surplus herrings has been developed as part of a policy of catching enough to keep all the normal outlets supplied. It is true that much of the herring landed since the meal and oil outlet was developed is suitable only for this outlet. Greater production from whatever cause would intensify the problem of disposing of the fish when landed. Possibly a really radical change of outlook as regards quality control from catching to retailing might succeed in reversing the post-war fall-off in fish consumption. In all probability only large firms will be capable of adapting themselves to such changes, although this does not necessarily mean that all large firms are at present producing the best products.

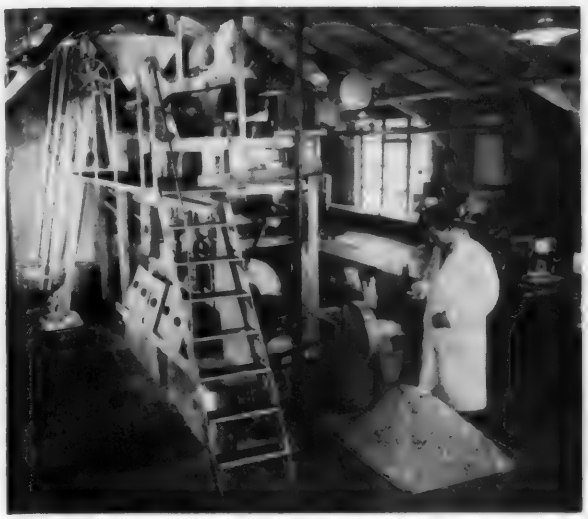
On general nutritional grounds it seems reprehensible to feed comestibles to farm animals, for the sake of their products, however much more acceptable bacon, eggs and milk may be than, say, herrings. Moreover, although obviously production of fish meal, of which there is a world shortage, is preferable to dumping whole fish, nevertheless it is an uneconomic outlet as it has to compete in price with such raw material as offal and fish heads. Furthermore, if and when synthetic essential amino-acids, such as methionine and lysine, can be made sufficiently cheaply to fortify poorer feeds, even this outlet for surplus fish may disappear.

The problem therefore arises of up-grading the utilisation not only of surplus fish, and of fish not at present regarded as worth landing, but also of filleters' offal. There is a vast field for the development of edible products for consumption in the under-nourished areas of the world. Already F.A.O. and the United Nations International Children's Emergency Fund has sponsored several promising experiments[32]. Surplus fish could be processed by smoking, etc., to provide products of a form acceptable in tropical areas. In this connection, however, it must be realised that Britain's fish costs more to catch than that of more fortunately situated countries.

Technical education

The revolution in outlook towards scientific research and quality control foreshadowed above will make necessary people in the industry trained and selected on more scientific lines than in the past.

Practically the only organised training in the industry at present is that occasioned by Ministry of Transport requirements for skippers and mates of fishing vessels, which is dictated chiefly by considerations of safety of life at sea. There is no statutory requirement for instruction in the catching of fish or its correct handling and stowage, although in other branches of the merchant marine the stowage of cargo constitutes an essential part of the curriculum, albeit partly for reasons connected with safety. There are also pre-apprenticeship schemes, financed partly by the White Fish Authority, which however are mostly designed to attract and test re-



(*Left*): **A small-scale white fish meal plant for test purposes.** (*Right*): **A Torry Research Station controlled fish smoking kiln of medium commercial size.**

cruits for the industry and do not aim at inculcating understanding of the principles underlying good industrial practice, which have been arrived at on the basis of trial and error.

In the fish processing and retailing field there have in the last year or two again been the first signs of an awakening. For example, at Grimsby the College for Further Education has been providing successful evening courses for fish wholesaler's staffs, and at London and various provincial centres there have been similar courses directed towards fishmongers and fish friers. Furthermore, Torry Research Station in January, 1958 ran as a trial a very successful full time, month's course intended to give a grounding in all aspects of fish technology. This course, in shortened form, will it is hoped be repeated annually, if, as seems likely, sufficient support is forthcoming from industry.

There is, of course, the National College of Food Technology, which however caters chiefly for a type of student which the fish trade is not yet, generally speaking, accustomed to produce.

The time will therefore soon be ripe for proper consideration by the appropriate authorities of the requirement in the industry of some form of qualifying certificate, indicating a degree of proficiency in fish technology, perhaps along similar lines to City and Guilds Institute Certificates in other food trades, such as bread making, brewing, etc.

This article was prepared as part of the programme of the Department of Scientific and Industrial Research.

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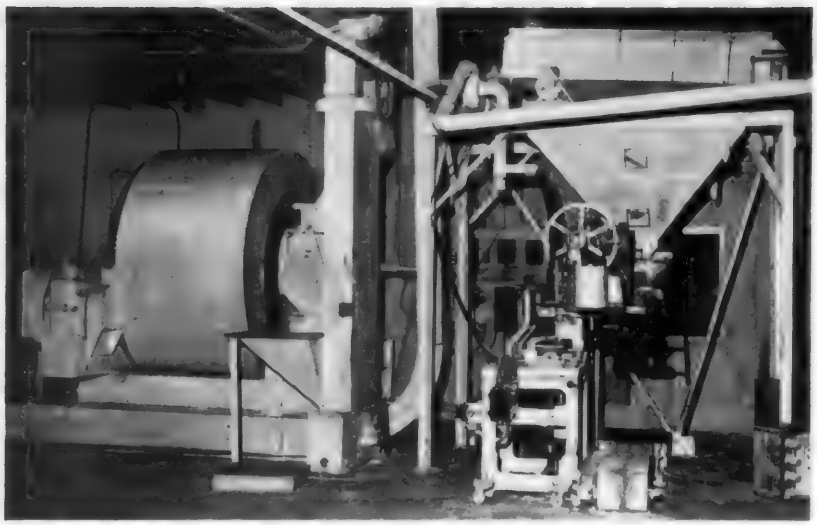


The blending and sifting plant in the works of the Major General Corporation, Paramus, N.J. The Sturtevant blender is on the left; at top right is the sifting machine which feeds the conical hopper from which sacks are filled via the weighing machine.

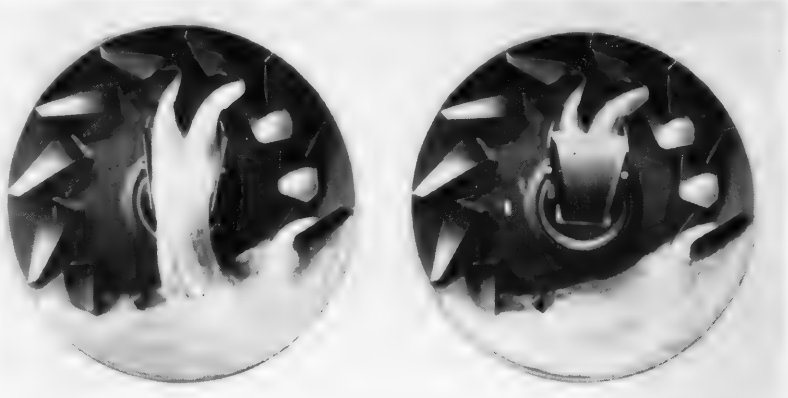
Blending Dough Conditioners into Bakers' Yeast

By A. E. Williams, Ph.D., F.C.S.

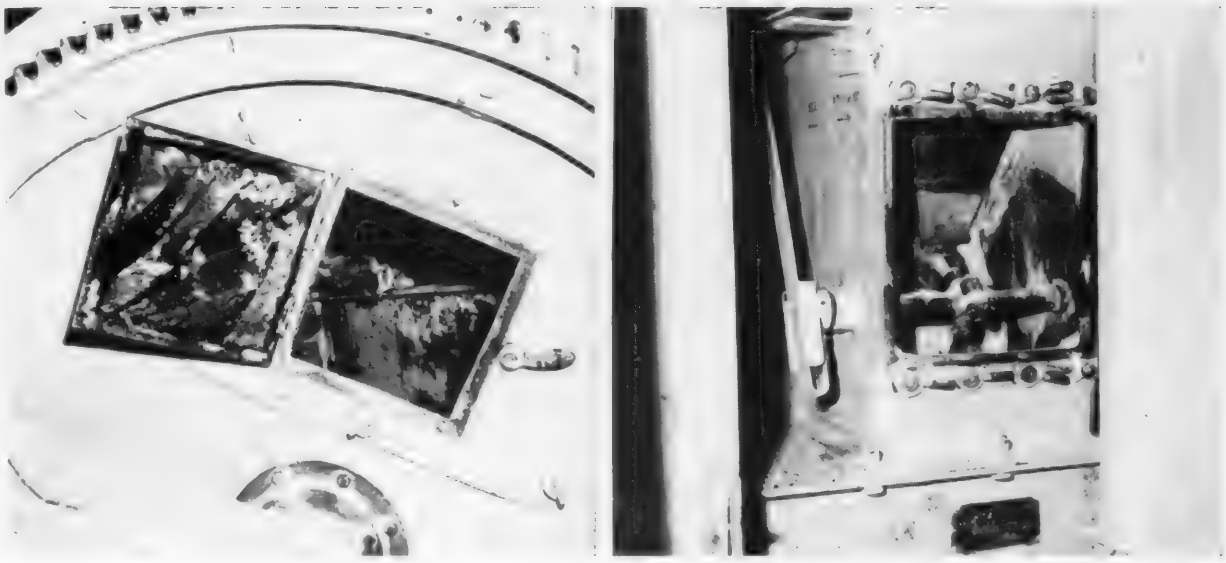
For large-scale baking, conditioners must be added to the yeast to prevent hydrolysis of its nucleic acid, and to do this difficult mixing a special machine, described here, is used by one of America's large manufacturers.

THE use of specially-prepared yeast (bakers' yeast) and other substances to enhance the properties of bread and other bakery products has been intensively studied in the past few years. Yeast supplemented with enzymes as a processing aid is receiving increased attention. Studies of the properties of certain protease systems used in bread-making show that undenatured gluten is less readily hydrolysed than hæmoglobin by the proteases of malted wheat flour and of the fungus *Aspergillus oryzæ*. The apparent activation energies calculated for several enzyme systems are similar for the hydrolysis of gluten, but variable for the hydrolysis of hæmoglobin. This indicates that similar peptide bonds are hydrolysed by the different protease systems acting on gluten. Investigations of the action of proteolytic enzymes in biscuit manufacture show that these enzymes appear to influence the gluten structure which affects the machinability and extensibility of the dough, thereby reducing the number of rejects and shrinkage in the ovens. With such enzymes in use it is important to maintain a suitable moisture content to promote a suitable rate of enzyme activity. For large-scale baking, either fungal or bacterial enzyme supplements are used. Papers given at the 1956 Convention of the American Association of Cereal Chemists included one on the rheological assessment of the action of proteolytic adjuncts in dough, and many interesting details are available in that paper.

Apart from supplementary enzymes which may be added to the dough, the function of the yeast itself is to aerate the dough by generating and expelling alcohol and carbon dioxide under the influence of heat in the oven, and to facilitate this, the composition of the yeast is carefully controlled and its reducing properties maintained. It is now generally accepted that the nucleic acid in yeast when subjected to mild hydrolytic conditions is split up into four equimolecular compounds or nucleotides. One of these is adenylic acid which, in an aqueous medium having a *p*H higher than 7.0 yields the nucleoside adenosine, which is a *beta*-riboside and possesses no reducing properties. To maintain the optimum reducing properties of the yeast,



These diagrams illustrate the charging (*left*) and discharging (*right*) action of the Sturtevant rotary batch blender.



(*Left*): **Quick opening plate gives full access to all moving parts of the blender.** (*Right*): **Rear plate opening through which small amounts of ingredients are introduced.**

it is, therefore, necessary to keep the yeast under the correct *p*H conditions to prevent the adenylic acid being converted to adenosine. Small proportions of appropriate and harmless chemicals are added to accomplish this. For example, a very small proportion of sodium sulphate added to the yeast is of appreciable value in maintaining quality.

Blending

To distribute these very small quantities of chemicals and enzymic products uniformly into a large bulky batch of yeast—which does not readily mix with anything—is beyond the capacity of many types of mixing machine. In the U.S.A., however, a rotary batch blender has been successfully used to do this job. This unit has been designed and built by the Sturtevant Mill Co., Boston, Massachusetts, and one of the organisations using it is the Major General Corporation, Paramus, New Jersey, one of America's largest manufacturers of yeast foods, dough conditioners, and fungal enzymes. In the M.G. plant the blender handles 25,000 lb. of products daily, processing them in batches of 2,000 and 3,000 lb., and before its installation a few years ago ribbon mixers were used, but these were inadequate for intimate mixing and for the throughput needed.

In the rotary blender the intimate dissemination of one product with another is achieved by a four-way mixing action. As the materials enter the drum, they are seized by a number of revolving scoops which carry the ingredients to the top of the blending chamber and cascade them. This action, coupled with the rotary movement of the drum, is supplemented by the forcing of the ingredients from both ends to the middle, lateral mixing actions with no separating effect. Blending is thus accomplished by four different forces: circular, vertical, and two-way lateral. During discharge of the batch, blending still continues, and both charging and discharging take place through the same gate. Because of this continuous blending action the amount of segregation which occurs is infinitesimal, and a uniform blend is obtained throughout the entire discharge process. The length of time the batch is in the rotary blender varies between 5 and 8 minutes, according to the nature of the ingredients, but as the action is one of blending only, there is no particle reduction, cleavage or attritional heat, so that no damage to the product occurs. While with the ribbon mixers previously employed there was an appreciable escape of dust and fine particles from the products—so destroying the accurate formulation as well as contaminating the working atmosphere—no such nuisance occurs with the sealed rotary blender. Easy accessibility is achieved by two openings (illustrated), one at the rear and one at the front of the unit. This greatly reduces the time required for cleaning, for the operators are able to get at all the inner parts of the blender within one minute to carry out periodical inspections, and most of the cleaning is done by circulating other materials through the blender. Apart from cleaning and periodical lubrication, maintenance is negligible.

A view of the blender and auxiliary plant installed in the M.G. works is seen in the illustration. The bulk materials which have to be blended are loaded into the blender with a bucket elevator, while those materials which form only small proportions of the batch are charged direct to the blender through the rear opening; usually such additions amount to only a few pounds for every ton

(*Concluded on page* 320)

Standards for Processed Soya

By E. Mitchell Learmonth,* M.Sc., F.R.I.C.

A general standard of quality is proposed for full fat processed soya covering enzyme activity, husk content and granularity.

SINCE the end of the second world war, great strides have been made in the technique of soya production. At all stages from the field to finished food, improvements have taken place that merit attention from users of soya in all branches of the food industry. Clearer knowledge of the underlying properties of the bean and their interactions, coupled with the improved control of preparative processes that this knowledge permits, make it now possible to define in objective terms most of the properties that affect the quality of the finished product. *The buyer of soya can use this information to specify the quality required for his purposes and to ensure, by simple, recognised tests, that the product bought does in fact come up to his standard of quality.*

The establishment of standards of quality agreed between the soya manufacturers and the food industry is clearly in the best interests of both. Selection of properties that are important to the soya user and capable of reasonably objective assessment has engaged the attention of the author and his collaborators for some twelve years. It is now believed that the properties that are really important to the user can be sufficiently closely controlled by the manufacturer to ensure reasonable uniformity in the product. The purpose of this article is to invite consideration of the topic by soya users—who now comprise a rapidly increasing proportion of manufacturers in every branch of the food industry—in the hope that agreement may be reached on a few criteria capable of measurement by simple, rapid and inexpensive means.

* British Soya Products, Ltd., Puckeridge, Herts.

Hitherto assessment of quality has been based chiefly on subjective judgment of colour and flavour, the only objective measurements being—in general—a proximate analysis and a sieve test. The objective measurements, though useful up to a point, leave uncertain several factors that may affect the performance of the product in certain applications; the subjective assessment, apart from the objections always associated with human judgment, gives no indication of stability and may indeed mislead the buyer since both qualities are subject to change in storage if the product has been imperfectly processed.

On what grounds is an objective assessment of quality to be based? After purity—freedom from deleterious foreign matter, in which the standard of soya is at least as high as any other primary foodstuff—the most important criterion from every user's point of view is neutrality of flavour. With this is bound up the question of stability, for both are reflections of proper processing. Third is freedom from particles of seedcoat which, being low in protein and fat and rich in indigestible fibre, lower the nutritive value of the product as well as detracting from brightness of appearance. Then comes granularity or fineness, a property in which some differences of requirement may arise for different applications, though in general "the finer, the better."

Flavour and stability

The assessment of flavour can only be subjective. Even the use of tasting panels only introduces an element of statistical uncertainty and cannot, except by tedious and laborious repetition over long periods, give an indication of stability. Experience in the author's laboratory indicates that both these factors can be assessed objectively by the chemical estimation of residual enzyme activity in the sample.

Raw soya contains a variety of enzymes having different sensitivity to processing conditions. As the severity of processing is increased so the flavour of the product changes and the activity of the enzymes falls. The problem was to correlate flavour differences with the activity of a suitable enzyme. Clearly an enzyme whose activity fell below measurable limits when or before flavour neutrality had been reached would give no indication that the product was under- or over-processed. After a good deal of investigation the residual activity of urease was chosen as the most convenient criterion.

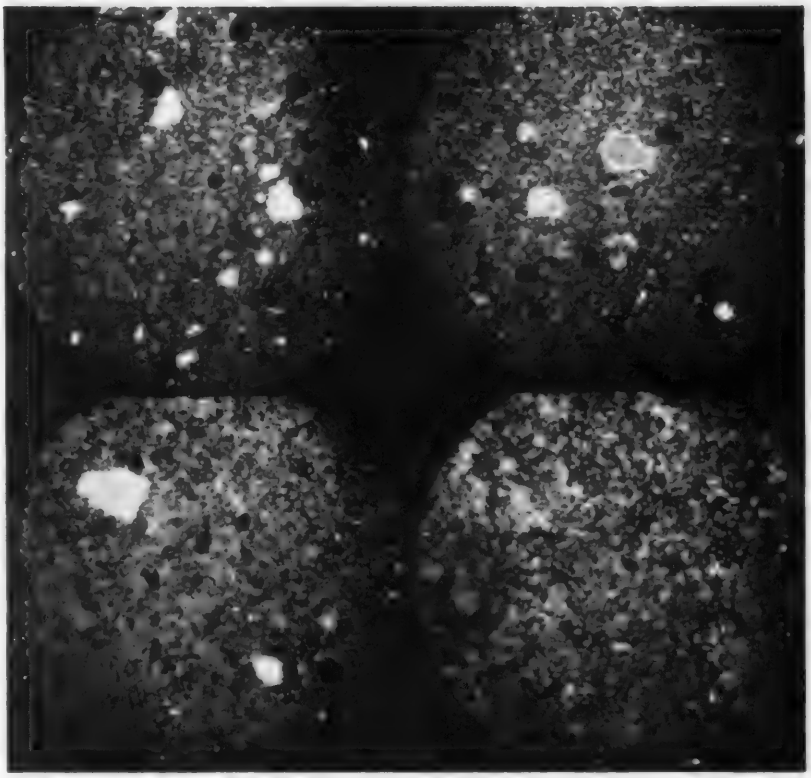
Urease has been suggested before as a means of controlling soya processing but chiefly on defatted soya for animal feeding purposes when entirely different criteria apply. The method adopted in the author's laboratory is a modification of the Conway microdiffusion method[1] which has been found to give reproducible results that can be related to flavour and stability. Table 1 shows urease activities of six commercial soyas, all of different geographical origin, of which the first is a substantially raw (unprocessed) flour and the other five are processed.

The urease activity in itself is not of much importance but the differences shown by the five commercial flours are a clear indication of differences in processing efficiency. Experience over many years shows that urease figures higher than eight units are associated with a beany or "boiled vegetable" flavour in the flour. This flavour in the freshly pro-

cessed soya may change on storage to a more genuine bitterness reminiscent of poor quality fats. It is characteristic of inadequate processing. Figures lower than four units are accompanied by biscuit-like or toasted flavours and a marked change of colour. Such soya may be said to be over-processed.

The limits between which soya can fairly be said to be properly processed are clearly narrow, and if flavour alone were to be relied upon as a criterion, different observers might well dispute the adequacy of processing of the same sample. An agreed reliance on urease activity would remove the cause of dispute.

It would also eliminate doubts about the stability of the product both in storage by itself and in admixture with other foods, especially those of high moisture content—for example, doughs, batters and sausage mixtures.



Photomicrographs of four different processed soyas under polarised light. Seed husk particles show up as bright patches against the darker background of protein-fat matter. Husk content can readily be assessed by this method.

Unwanted enzymes

Among the enzymes of the raw bean that could theoretically give rise to anxiety are lipase and perhaps lipoxidase. Of these lipase is certainly the more dangerous. It is the enzyme that splits fats into free fatty acid and glycerol and its reduction to the lowest possible value during processing is considered essential if the product is to be free from criticism. Minute quantities of volatile fatty acids can have pronounced effects upon flavour. These and their oxidation products are probably important contributors to the original flavour of the raw bean. A degree of processing that removes them but leaves a residual lipase activity capable of generating more is not a sufficient degree to ensure stability. In the light of this argument the comparison of urease and lipase activities in Table I is important.

The method of measuring lipase activity used in this comparison is a modification of that of Templeton and Carter,[2] and the figures quoted in Table I are actually the percentage increase in free fatty acid after six hours incubation under controlled conditions that favour the enzyme. Clearly one sample is greatly to be preferred to the others which under the same conditions produce twice as much, or more than twice as much free fatty acid. It may well be true that the residual lipase activity in these other samples is responsible for the changes in flavour observed by tasting panels in such samples during storage.

Just how important this residual activity may be in food products depends on a number of factors outside the control of the soya manufacturer. The proportion of soya, the presence and quantity of added fat or fatty foods, moisture content, intimacy of mixing, temperature and the proportion and quality of other potential sources of lipase (especially cereals) may sometimes outweigh the effect of the activity of the soya. But it can hardly be disputed that soya having the lowest lipase activity is more stable and therefore of better quality than soya in which lipase is demonstrably more active.

Lipoxidase is occasionally mentioned as a source of danger of oxidative rancidity in unprocessed soya. If the enzyme is present in an active state a danger exists, but it is often greatly exaggerated. The enzyme operates by transferring oxygen from aqueous solution to certain types of fat producing peroxides which subsequently break down to give rancid-tasting products. At normal moisture contents soya, even when raw, shows no sign of peroxide formation over long periods of storage. If dispersed in water and beaten with air or oxygen, raw soya can be used as a powerful oxidising and bleaching agent; for example, in the production of bread. But if the soya has been processed to the correct degree no sign of this oxidising capacity remains. Measurement of lipoxidase activity is troublesome and the use of urease as an index of correct processing is a safe and preferable guide. Soya having a urease activity of six units as defined above carries no risk of promoting ran-

cidity through enzyme activity.

On the contrary, it is a powerful antioxidant by reason of its natural content of tocopherols, especially *delta*-tocopherol, the most potent antioxidant of the group.

This substance not only preserves the soya fat from rancidity but also preserves added fats and other fatty foods if soya properly processed as defined above is intimately mixed with them.

I. Variations in enzyme activity of commercial processed full-fat soyas*

	Urease activity (units)	*Lipase activity*
Unprocessed soya	148·0	1·260%
Processed soya A	16·2	0·133%
" " B	14·1	0·093%
" " C	5·8	0·050%
" " D	21·2	0·170%
" " E	16·1	0·141%

II. Sieve analyses of commercial full-fat soyas.*

	On 100 BSS	*On 150 BSS*	*On 200 BSS*	*Thro' 200 BSS*
Processed soya L	5·3%	13·5%	5·1%	75·0%
" " M	17·2%	12·0%	4·5%	63·1%
" " N	0·4%	1·6%	5·9%	90·0%
" " O	5·0%	13·0%	54·0%	22·5%
" " P	7·6%	7·2%	6·7%	73·1%

* *Several countries of manufacture are represented in both tables.*

Presence of husk

Soya beans, after separation from the pod, are still enclosed in a tough, fibrous sheath called the seed coat or husk. This coat is difficult to remove completely, and in commercial production of soya for human food complete separation can only be attained with considerable loss of flour—a low extraction rate. The quality of the soya is lower the more husk is left in the finished product. In the best quality little or no husk is therefore a direct measure of quality in this respect.

Several methods of estimating the husk content exist but not all are reliable or easy to carry out. Visual inspection of the sample flattened with a broad spatula on a smooth surface or pressed under plate glass will serve to disclose coarse husk particles, but it is possible, during the milling process, to separate the husk, grind it finely and add it to the soya afterwards and its presence then is not so readily detected. A chemical estimation of the total crude fibre content should show the presence of excessive proportions of husk, but fibre determinations are empirical at best and, except in the hands of an experienced operator doing the same work regularly, are likely to give variable results.

Sieve analysis, coupled with microscopic observation of the fractions, does permit a rough estimate to be made, but with fine soya sieve analysis itself is difficult and lengthy, and no really quantitative figures can be obtained that would justify such an expensive examination.

A convenient method of comparing rapidly a number of samples is to inspect through a low power microscope using polarised light. Against the dark background the husk particles show as brightly illuminated structures. These can be counted quickly in a number of fields and a useful indication of quality obtained in a very short time.

The illustration shows photomicrographs of four commercial soyas examined in this way. A good quality soya should show no light particles or at most very few.

Granularity or fineness

This property is not only an indication of the trouble the soya manufacturer has taken to prepare a product of high quality, it is also of great importance to the buyer especially for the manufacture of soups, sauces, confectionery products, salad creams and emulsions generally.

For most manufacturers of the kinds mentioned above a simple and quick assessment can be obtained by placing samples side by side on a smooth surface and flattening with a broad spatula so that the samples are in close contact. This method, though only comparative, will show quite small differences in granularity. Fineness is reflected in a paler colour of the smoothed surface of the sample and in the absence of specks. Colour alone may be misleading since soyas of different origin vary slightly in natural pigment and more strongly coloured samples are not necessarily coarser in granularity. Moreover pale shades may be an indication of inadequate processing and dark tones of excessive treatment. Confirmation of these would be given by the urease test indicated above. Specks disclose coarse particles but coarseness alone may not be disclosed by speckiness if the sample is of fairly uniform particle size. This method of comparison, though purely subjective is probably the best in the hands of an inspector experienced in the comparison of soyas. Objective methods are more troublesome and may not be much more informative.

A straightforward sieve analysis, using the brush technique, will serve to give an upper limit of coarseness. A good soya should not contain more than 2-3% coarser than 150 BS mesh and the bulk of the flour should pass 200 mesh. See Table 2. Finer than this it is impossible to go with sieves because of the clogging properties of the flour and so the bulk of the sample cannot be examined by this method.

Solvent extraction followed by sieve analysis of the fat free residue will enable the analysis to be taken to 300 BS mesh but the sample is altered by the extraction. The figures obtained are not directly related to the original sample and it may well be found again, that the bulk is too fine for further examination by this means.

The problem resolves itself into a determination of particle size in the sub-sieve range. A number of methods exist, chiefly designed for inorganic matter like cements and dusts, but they are not readily applicable to the complex structure of soya and their interpretation involves a number of assumptions that are almost certainly untrue for soya. Moreover, the real importance of particle size in the sub-sieve range has yet to be proved for most applications in food manufacture. Probably, for those applications in which it is important, methods of measurement will have to be related to the applications themselves.

For existing applications of soya in the food industry visual inspection coupled with a straightforward sieve analysis probably gives the most useful guide to granularity.

Summary

A general standard of quality is proposed for full fat processed soya which can be tabulated as follows, the methods adopted being those recommended above:

Urease Activity: 5-8 units.

Lipase Activity: Not more than 0·05% of oil hydrolised.

Husk Content: not more than 4 particles in 4 fields.

Granularity: Visual inspection; smooth speck-free surface.

Sieve analysis: not more than 2·5% on 150 BSS.
not less than 85% through 200 BSS.

Details of the recommended methods of examination may be obtained from the author.

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Aerosols and Pressurised Packs

WITH the growing importance of pressurised packaging, a comprehensive book* on the subject is timely. Herein are described, first, a history of this form of packaging and we learn with surprise that the first patent was taken out in 1889. There follows a description of the properties of three-phase systems, analyses of the phase diagrams of mixtures of various propellants, and a discussion of propellants in general. The various types of container are discussed, and the machinery and filling equipment required. The section on formulations contains a chapter devoted to food; products suitable for packaging in this way include cream, salad dressing, ketchup, mustard, peanut butter, flavoured syrup, spreads, and concentrates. In the U.S.A. more use of pressure packaging for food has been made than in this country, and it may be that at present cost is the limiting factor as far as food is concerned. However, the potentialities of aerosols (a term which, when used in connection with pressurised packaging is strictly a misnomer, but which has now stuck) are very great, and the manufacturer who wishes to explore their possibilities will find here a very useful technological guide to the whole subject.

* *Pressurised Packaging (Aerosols)*. By Herzka and Pickthall. Butterworths, London, 1958. (American edition by Academic Press, New York.) Pp. 411, illus. 63s. net.

Wine Production

FOR some years amateur wine makers have been able to buy a book which encouraged a scientific approach enabling faults and errors to be appreciated and corrected. This book* has now been rewritten, improved and enlarged to include mead, vermouth and liqueurs.

The principles of wine-making are explained, together with the practice involved. Production details are given for various fruit and vegetable wines, grape wines, mead, cider, perry, vermouth and liqueurs and others. The directions given in the book for the production of fruit wines are nearly all based on personal experience, and the wines, mainly fruit wines, have all been successfully produced in large and small quantities in the author's laboratory.

* *Successful Wine Making—including Mead, Vermouth and Liqueurs*. By S. M. Tritton. Pp. 52. Almondsbury, Glos. Grey Owl Laboratories. 5s.

I.C.I.'s Food Colours Plant

(*Continued from page* 304)

ing on the product. Air heated by steam in heat exchangers is fan-circulated over the trays containing the product. After drying, the trays are emptied by hand into drums in an emptying cabinet so draughted as to prevent contamination of the operator.

Analytical control

After manufacture, the colours are subject to stringent analytical examination before being packed for sale. Among the instruments in the laboratory which we were interested to see was a Hardy recording spectrophotometer made by the General Electric Co., Ltd., with which the full absorption spectrum of the colour under test can be traced automatically on a chart in 56 seconds. Among other tests, the presence of unwanted subsidiary dyes formed during the coupling reaction is detected by paper chromatography, while the contents of metallic and other impurities are determined to extremely fine limits.

The present range of *Edicol Supra* colours exceeds 25, some of which are mixtures.

Machinery and Equipment

OIL-FREE COMPRESSORS

In a number of industries where compressed air is used one of the principal requirements is that the air should be completely oil-free. Food preparation, confectionery and certain chemical processes have this problem.

The WNO-112 compressor produced by Joy-Sullivan, Ltd., Air Power Division, is believed to provide the answer. It is a special version of the WN-112 two stage double-acting water-cooled compressor. Air capacity ranges from 400-850 cu. ft. in free air delivered. Of V-vertical construction the compressor, according to the makers, requires a minimum of floor space while provision for a flange-mounted motor helps even further to keep down space requirements.

The WNO-112 has carbon graphite piston bearing and sealing rings in place of oil lubrication in the cylinders. Long rod construction with carbon-graphite piston rod/crankcase packing and baffle to guard against oil creep are said to ensure that the air delivered is completely free from oil contamination.

The compressor has a semi-steel main frame machined on the bottom and fitted with levelling screws to ensure accurate erection. The entire crankcase is fully enclosed and dustproof while side openings with removable covers give access to crosshead pin and crank pin boxes. The centre line of the pistons is inside the frame, keeping the reciprocating force inside the frame.

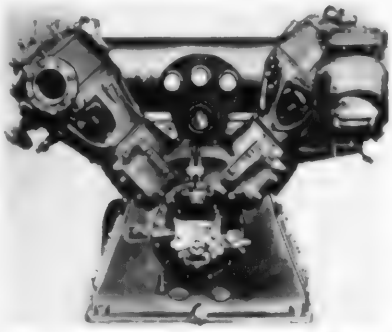
B.E.N. Patents, Ltd., have added two machines to their range of small air compressors which are claimed to ensure a delivery of clean compressed air free from any taint of oil.

The two units, CAR 10 and CAR 15, are twin cylinder, single stage models, with displacements of 10 and 15 c.f.m. respectively, for continuous operation at pressures up to 100 p.s.i.

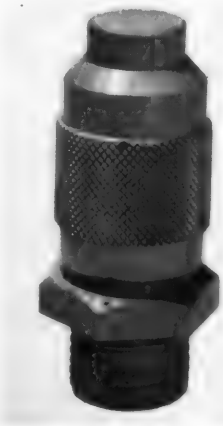
The crankshaft and big ends are lubricated by means of a ring at each end of the shaft which picks up oil from the sump and the makers say that a dividing plate located at the cylinder base, fitted with a scraper gland, effectively prevents oil from entering the cylinders.

The finned cylinders are constructed of a non-corrosive alloy and cooling is aided by a vaned type flywheel. Pistons and connecting rods are also made of a non-corrosive alloy, and the rings, which are of self-lubricated carbon, are chemically inert to most acids.

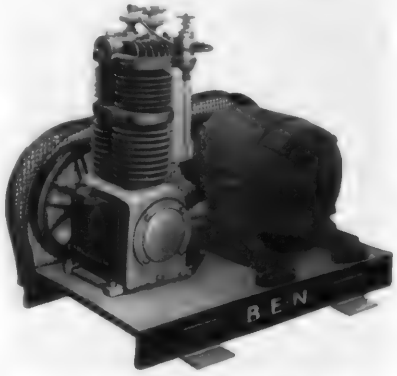
The compressor is fitted with a dry type suction filter and can be provided with unloading equipment to operate in conjunction with air governor or pressure switch control. It is available as a complete unit; the compressor and electric motor are mounted on a steel base.



The Joy-Sullivan WNO-112 oil-free compressor is designed for use in the food and confectionery industries.



This speed regulator for compressed air cylinders is made by the Baldwin Instrument Co., Ltd.



The CAR compressor made by B.E.N. Patents, Ltd., is said to ensure a supply of oil-free air.

SPEED REGULATOR

Baldwin Instrument Co., Ltd., are now producing an improved speed regulator for use with their compressed air cylinders. These new units are an improved development of the earlier micrometer type, and have a regulation of at least 3 times that of the previous model. The bore sizes are ¼ in., ½ in., ¾ in., and 1 in.

The speed regulator is slightly larger, and utilises the same two-piece construction as its predecessor. The unit is made from anodised Duralumin. A friction device incorporated in the body of the regulator prevents the micrometer adjustment from being disturbed by vibration.

FOAM PLASTIC SPLITTERS

F. J. Edwards, Ltd., have been appointed sole agents in the U.K. for the *Kuris* cutting and splitting machines, for soft and rigid foam plastics, foam rubber and similar materials.

The main items from the range are: the *RBW* horizontal splitting machine which has a capacity of 45 in. or 63 in. wide by 80 in. long; the *RBME* vertical cutting large band knife machine which can accommodate blocks up to 80 in. long; the *BKR* for cutting smaller synthetic foam pieces; and the *ZBM 58* sponge cutting machine which is portable.

D.C. AMPLIFIER

Fielden Electronics, Ltd., have announced a new D.C. amplifier having a stability of 0·1%. This amplifier is designed for use as a component in all systems where a D.C. output of several milliamperes directly proportional to a D.C. input of a few millivolts is required with a high degree of repeatability. Typical applications are in strain gauge systems for weight measurements, and in temperature control systems where a saturable core reactor is used.

For weight and force measurements a resistance type strain gauge or load cell fed from a stabilised D.C. supply is connected to the input of the D.C. amplifier and the output of the amplifier is fed to an indicator or recorder to show or record weight, force in lb., tons, etc.

DRYCOATING MACHINE

Manesty Machines, Ltd., have introduced a new machine, the *Bi-Cota* for combined tablet making and compression coating which permits two coatings to be applied to a core in a continuous process. It will also produce single coated tablets or ordinary uncoated tablets.

Two models are available, the "600" and the "900." Outputs are: tablets with two coatings, 320/900 per min.; tablets with one coating, 320/900 per min.; and uncoated tablets, 960/2,700 per min.

The machine will also produce capsule shape coated tablets with either one or two coatings.

Manesty say that the machine includes many features of the *Drycota*. Optional extras include: hydraulic pressure indicators to each press; tachometer calibrated to read tablets per min.; and *CenterCota* attachment for coating prepared cores.

CASE HANDLING MACHINE

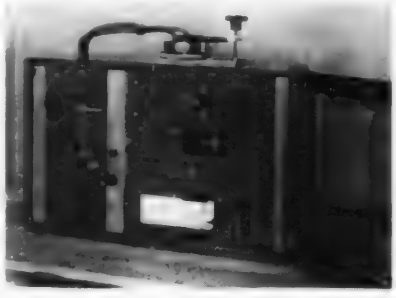
For manufacturers who wish to apply gummed paper tape across the top and bottom centre seams of fibreboard or corrugated cases containing their products in addition to gluing in the normal manner, Adams Powel Equipment, Ltd., have developed a combined gluing, sealing and taping unit known as Model 520.

This machine is stated to be fully automatic in operation, accepting cases directly from a conveyorised line by means of an automatic timer which releases the cases to the machine one at a time at a prearranged speed. The machine can handle up to 20 cases per minute. On being released to the machine both the top and bottom flaps of the cases are opened automatically for simultaneous gluing and whilst the bottom flaps are open the case contents are supported on a strong steel glued platen preventing any displacement. After gluing the flaps are ploughed back into position and the freshly glued case is transferred to the taping unit. Here a strip of gummed paper tape 1 in. to 3 in. wide is automatically applied across the top and bottom centre seams and for a short distance up the sides. Short taping (across the top and bottom only) can be effected if required. The cases are then automatically transferred to a short compression conveyor which holds the flaps in position until glue drying is complete. Since the cases are under compression whilst in the taping unit Adams Powel say that a much shorter compression unit than on a standard gluing and sealing machine is possible and the combined unit is in fact no longer than a standard machine for gluing and sealing only.

A case-operated switch is fitted to the entrance of the compression unit and this unit only runs until the case is absorbed between the two belts. The case then remains stationary under compression until the arrival of the next case. This arrangement allows maximum time in the compression unit but never allows the cases to come into contact with each other.

The machine is 19 ft. 3 in. long × 5 ft. 2 in wide × 5 ft. 4 in. high and will handle fibreboard or corrugated cases 8-20 in. long × 6-15 in. wide × 6-20 in. high.

A shorter version arranged for hand feeding has also been introduced and this model is known as the 560. This unit is only 8 ft. long and is ideal for manufacturers having a limited throughput and using cases under 15 in. in length. There is also a bench model which can be incorporated into existing packing benches, this requiring no additional space. This is known as model 562.



The Sigrist photometer is now available in this country from Southern Instruments, Ltd.

PHOTOMETERS

Photometers made by the Swiss firm of Sigrist are now being supplied in this country by Southern Instruments, Ltd.

The photometers are divided into two main categories, for industrial and laboratory use.

All types are stated to employ a design feature which enables continuous measurements of turbidity and colour to be carried out quite independent of the usual sources of error found in conventional photometers, *i.e.* variations in photocell sensitivity, light source intensity and amplifier gain.

One type of *Sigrist* industrial photometer uses flow cells for turbidity and/or colour measurements having a wide variety of finishes for corrosive liquids and gases. Other types enable turbidity measurements to be made from the surface of a liquid and colour measurements from a free flowing jet.

Weather-proof cases are claimed to make operation possible under the most arduous conditions.

The Sigrist laboratory photometer makes turbidity and colour measurements possible from static measuring vessels and due to its independence of instrumental variations, many samples may be continuously compared with a standard over long periods, without adjustments.

The laboratory photometer may be fitted with a built-in monochromator and recorder if desired.

PROTECTIVE COATING

A protective coating composed of synthetic polymers with special additives which are variable to give protection against rust, corrosion, abrasion, adhesion, exposure and/or scale formation is now being marketed in this country under the name of Lanshield *Sakaphen* coatings.

It is not claimed that the product is a complete substitute for stainless steel but rather that under certain conditions complete protection is offered and allows stainless, acid resistant steel, non-ferrous metals, ceramic coverings, etc., to be dispensed with.

The coating is bonded to the surface by special processes which are said to make the new surface impervious to shocks, staining, abrasion, and the action of chemicals depending on the type used.

The coatings are available from Wolseley Holdings, Ltd.

MACHINERY AGENTS

Soag Machinery Co., have recently concluded a sole sales agency agreement with Machines Automatique Ciliotta of Paris for their complete range of labelling and capping machines. Soag say that batteries of *Ciliotta* machines are in use all over the world and that, price-wise, they compare more than favourably with their competitors.

Ciliotta offer semi-automatic and fully-automatic labelling machines for labelling flasks, bottles, tins, cans, of almost every conceivable shape and dimension. Units are available for affixing up to three labels simultaneously, *i.e.* around the body, throat and neck on wine and champagne bottles, by means of glue or for applying heat-seal labels.

Among these is the *Vita 78* fully automatic labelling machine which can form part of a complete production line, receiving bottles standing upright in the same way as they have passed through previous machines in the line, *i.e.* filling and sealing machines. An existing continuous bottle conveyor can be utilised which completely eliminates any question of transference of bottles from one machine to another. Bottles arriving in rows or singly are fed into the machine without manual contact. When a bottle is missing no label is fed. Speed of operation is adjustable between 2 and 4,000 per hr.

Other machines include the *Novacap* automatic machine for applying aluminium caps to bottles at up to 6,500 closures per hr. and the *Cap* semi-automatic bottle sealing machine for use with aluminium closures.

Advances in Food Technology

BAKING

Irradiated Flour

Loaf volumes of bread baked from two grades of flour (patent and baker's) were decreased by irradiation of the flours with Co^{60} gamma-rays at dosages of 0·25, 0·5, and 1·0 million roentgens. Recoveries of crude gluten from all the irradiated samples were also decreased. A marked adverse bromate effect, as well as an increase in the water-soluble nonprotein nitrogen, was found for the flours that were treated with 10^6 roentgens. A regular increase in the maltose value and gassing power with increasing doses of radiation was observed for both types of flour.

No rise was found in the starch-breakdown power of the papain extracts of the irradiated flours, suggesting the absence of a possible activation of the beta-amylase in the flour. On the other hand, it was noticed that the autolytin production of reducing sugars from mixtures of non-irradiated flour and irradiated starch was shown to increase with the increasing irradiation of the starch. Similarly, rises in the saccharifying power were noted for papain extracts of nonirradiated flours when dispersions of irradiated starch were used as the substrate.

It was concluded from the findings that the increases in maltose value for the irradiated flours were due to an enhanced susceptibility of the starch in the irradiated flours to hydrolysis by beta-amylase.—C. C. Lee, *Cereal Chem.*, 1959, **36** (1), 70.

ENZYMES

Properties of Ficin

The proteolytic enzyme or enzymes of fig latex, ficin, has been shown to have properties which make it suitable for use as a meat tenderiser and a clarifier of beverages. It also coagulates milk rapidly. This latter property could be of considerable value in countries where there is an objection to slaughtering calves for the production of rennin.

The work carried out was divided into two phases, one studied the effect of changes in the substrate solution and the other studied the effect of changes in the enzyme on the milk coagulating ability of ficin. The objects were to find out the component responsible for the coagulation and determine whether this was any different from the component responsible for the proteolytic activity.

The clotting time for the action of ficin on milk was influenced by the enzyme concentration, *p*H, volume of substrate, substrate concentration, age of substrate and temperature. The milk clotting activity of ficin is inhibited and activated by the same reagents which inhibit and activate the proteolytic activity. The milk clotting activity is dependent upon a free sulphydril group in the enzyme.—J. R. Whitaker, *Food Technol.*, 1959, **13** (2), 86.

FISH

Amino Acid Composition

The flesh of four species of fish was analysed: cod, haddock, lemon sole and herring. The fish were all caught in the North Sea and kept in ice for 2-3 days before filleting.

The resultant figures of amino acid recovered per 100 g. of protein are given, the results being obtained by chromatographic analysis of the hydrolysates.

Only slight differences were found between the fish tested. The results are compared with other published work on the same and different species.—J. J. Connell and P. F. Howgate, *J. Sci. Food Agric.*, 1959, **10** (4), 240.

MALT PRODUCTS

Evaluation of Sweets

Various types of sweets have been examined chromatographically and related to the chromatographic findings of the malt extract itself and the starch hydrolisate. The first showed dextrose, maltose, an oligosaccharide and a trace of sugar. Sucrose was absent in starch hydrolisate, which, however, contained two additional different oligosaccharides. These were also found in malted sweets.

The actual malt extract content of these sweets could therefore not be assessed by determination of their maltose content. As only malt extract contains P (phosphorous), this could be determined as P_2O_5 and the maltose content derived from malt extract calculated from it.

Six varieties of malt extract sweets were examined and found to contain: sucrose (66·8 to 83·7%), maltose (2·8 to 8%), glucose (5·7 to 10%), and oligosaccharides (8 to 14·9%).

The P_2O_5 ranged from 22·8 to 55·0 mg. per 100 g. This, if converted to the malt extract content of the sweets, gave 4·1 to 9·2%; a similar calculation based on the maltose gave 5·6 to 15·9%.—H. Hadorn, *Mitt. Lebensmitt. Hyg., Bern*, 1958, **49** (5), 290.

FAT FLAVOURS

Effect of carbonyl compounds

The relationship between flavour deterioration and the content of carbonyl compounds in edible fats has been the subject of experiments, with differentiation between the volatile compounds, which impart a rancid flavour, and the tasteless non-volatile compounds. An empirical method of estimation of the former was devised and gave better correlation with oxidative rancidity than either the peroxide value or the total carbonyl value. The volatile compounds may be derived from the non-volatile by the action of heat or storage.

The improvement in the shelf-life at 50°C. of fats to which antioxidants had been added, is paralleled by reduction in the increase of both the total carbonyl value and the volatile carbonyl index as determined by the aforesaid empirical method. The estimation of carbonyl contents may be used to assess the effectiveness of antioxidants in biscuit fats.—N. W. Berry and A. A. McKerrigan, *J. Sci. Food Agric.*, 1958, **9** (11), 693.

Blending Dough Conditioners

(*Concluded from page* 313)

or more of product in the blender. After discharge from the blender, the product is conveyed through a link-belt *Bulk-Flo* to a sifting machine, thence to a feed hopper, from which bagging takes place on an automatic scale set to a weight of 100 lb. The multi-wall bags are sewn on a Union Special sewing machine. Cleaning of the plant is normally carried out by the use of salt, under vacuum produced by a Hoffman unit. Where any traces of salt which may still remain in the system are likely to affect the incoming batch, such traces are cleared by circulating flour or starch. The main market for the blended products is with the large bakeries throughout the U.S.A. and Canada, and the products are formulated by the aid of the blender to an accuracy of within one-sixth of 1%.

News Digest

New Cerebos Research Laboratories at Edinburgh

(*Top, left*): **The building, formerly a grain warehouse, which houses the new Cerebos research laboratories.** (*Top, right*): **Interior of the main laboratory.** (*Bottom, left*): **Sir Edward Appleton receives from Mr. W. A. Innes, Chairman of Cerebos, a pair of antique silver salt cellars.** (*Bottom, right*): **Part of the library.**

The new laboratories of the Cerebos group of companies at Colinton, Edinburgh, were opened on May 20 by Sir Edward Appleton, Principal and Vice-Chancellor of the University of Edinburgh.

The building was originally a grain warehouse, and was well suited for conversion. In pleasant surrondings within easy reach of Edinburgh, it has four floors each with an area of 2,500 sq. ft. Although not usual practice, the top floor was allocated for pilot work, since it had greater head room than the other floors. A new staircase was built, all the old warehouse windows were removed, extended and replaced by modern glazing.

A new lift was put in and extensive use made of half-glazed "Holoplast" partitioning. During the alterations, scientists were recruited, and the senior staff now includes a physical and inorganic chemist, a bacteriologist, a microbiologist, a packaging officer and a product development chemist. Assistants are employed and the whole organisation is controlled by the Chief Research Chemist. One floor of the laboratory was completed at the end of September, a further floor a month later, and the pilot plant floor by the end of May. The laboratories have all modern facilities, and a technical library, which distributes more than 80 periodicals in addition to information, is housed within the department. Laboratory facilities cover all aspects of chemistry and biology.

OBITER DICTA

● Canada has developed an odourless onion. Only the smell has gone. The taste and flavour remain.—*Daily Express.*

● One had heard of other uses for Scotch whisky than the usual one. There was, for example, the story of the Scot who was cured of lumbago when it was rubbed on the afflicted part, but who suffered thereafter from a dislocated neck.—*"R.S." in Manchester Guardian.*

● Commenting on the supposed naïveté of the Papuan cannibals who killed and ate a local policeman, a senior Native Affairs officer remarked that they "don't seem to realise that for every administration man they kill, there are boatloads to take his place."—*Daily Telegraph.*

● One day my father was getting out of his car, parked near the market square, when he noticed an old gipsy woman carefully wiping a horse's mouth. She evidently saw his surprised look, because she said with a grin: "Ar, 'e do like 'is ice cream."—*Letter in Woman.*

● Among the customers in a food shop there might be four old gentlemen smoking shag, four smoking cheroots and some taking snuff. If an assistant takes a surreptitious puff at a cigarette, the whole majesty of the criminal law descends on her.—*Counsel at Middlesex Appeals Committee.*

● I noticed on one of his cookery shelves a metal-spouted bottle of the type with which barbers spread oil on my scanty locks. "What is it for?" repeated M. Badoux, surprised at the question. "Mais, naturellement, one sprays cognac on chicken while it is roasting, but for lamb nothing else will serve but good Scotch whisky."—*"R.S." in Manchester Guardian.*

● At the Plenum of the Main Board of the Union of Agricultural Workers held in Warsaw it was stated that the profits of the State Farms were only slightly higher than in the corresponding period of last year and that serious efforts would have to be made to avoid exceeding the planned deficit.—*Report of Express Services Branch, Board of Trade.*

Where are these People Now?

This picture was discovered during a recent perusal of our archives, and shows a Canning Convention dinner presided over by Mr. W. Leonard Hill, Chairman of the company which publishes FOOD MANUFACTURE, held some time during the late 1930's. Third on Mr. Hill's right is the late T. Crosbie-Walsh, a former editor of this Journal, and in the picture are some famous faces. Can any reader recognise himself or name any of these people?

Erection service

Q.V.F., Ltd., have now developed an erection service, staffed by technicians who have received specialised training in the erection of their products. This is designed to complement the assistance which Q.V.F. offer with design and erection methods.

A.P.V. agents

The A.P.V. Co., Ltd., and the Dairy Supply Co., Ltd., have concluded arrangements for the sale of A.P.V. dairy equipment in Northern Ireland to be handled by the Belfast branch of the Dairy Supply Co.

Change of address

The new address of the Mellins group is: Mellin House, 56-60 Hallam Street, London, W.1. Tel. LANgham 9201.

The executive and sales departments of Mellins Food, Ltd., Ascotts, Ltd., and R. Hyde and Co., Ltd., will be accommodated in the same building.

G. Havinden, Ltd., who were recently acquired by the Mellins Group, will also move to Mellin House and operate from there.

New Liverpool cold store

To supplement their two small cold stores at the Kirkby Trading Estate, Liverpool, Birds Eye Foods, Ltd., have planned the construction of a new cold store for quick frozen foods. Smiths Insulations, Ltd., have been awarded the contract for the cold store structure.

The store will be fully equipped for handling the products using a railway dock, covered siding and covered loading bay.

New factory

"J.D." Insulating Co., Ltd., have moved into their newly-completed factory at Brokenford Lane, Totton, Southampton. Tel.: Totton 2621/2. The firm say that the factory has been built in order to cater for the expansion of our business in the south.

Company merger

Hess Products, Ltd., and the chemical division of Armour Chemical Industries, Ltd., have been merged under the name of Armour Hess Chemicals, Ltd., of which half the share capital is controlled by Armour and Company of Chicago, whilst the other half is controlled by United Kingdom interests, including a substantial proportion by Associated Chemical Companies, Ltd.

Sales branch

A new Kraft sales branch has been opened at East Kilbride, near Glasgow, by Sir Patrick Dollan, D.L., LL.D, J.P., who has been responsible for much of the initial work in connection with the East Kilbride Development Corporation.

This new branch is capable of handling 7,500 tons of goods each year. A staff of 70 will be employed.

The East Kilbride branch consists of a single storey administrative block and the warehouse, which is specially designed to be dust-free with a non-slip floor. The cold store has a capacity of 29,250 cu. ft. and is designed for storing natural cheese and other perishable products. A separate building for maintaining the transport and equipment and building in general has also been added.

People

LT.-COL. W. B. V. H. P. GATES and MR. H. W. CLEMENTS have been appointed directors of Aplin and Barret, Ltd.

•

MR. I. H. GORDON has been appointed assistant sales manager of Cambridge Instrument Co., Ltd., at their head office in London. He will provide additional liaison between head office and the 10 branch offices, and will assist sales promotion generally.

Company Profits & Prospects

Schweppes' record profits

The chairman's annual report for Schweppes, Ltd., notes that the record consolidated profits for the group amounted to £3,236,897 which was attributable to better business at home and improved results overseas.

The consolidated net profit at home before charging taxation amounted to £2,525,353 for the year ended December 31, 1958, compared with £2,118,925 for 1957.

Referring to 1959, the chairman reported that sales for the period up to the end of April were up by 6·2% and with a reasonable summer a good year could be expected. A final dividend of 15%, less tax, was approved.

Heavier pig trend

Speaking at the a.g.m. of the Danish Bacon Co., Ltd., the chairman, Mr. Frank Herbert, said that the introduction of vacuum film-packed bacon during the last year and the formation of a subsidiary company which had put the idea into commercial production would, he believed, encourage the development of a heavier and more economical pig.

Despite keener competition, the volume of trade carried out by the company continued to grow.

The group profits for the year ending December 31, 1958, were £363,370 (£516,365). After providing for taxation, the profits were £175,244 (£236,144).

Mackintosh's smaller margins

Reviewing the activities of J. Mackintosh and Sons, Ltd., for the year ended December 31, 1958, the chairman, Viscount Mackintosh, said that during 1958 sales had only just held their own, sales being not quite so buoyant. He was not very optimistic about 1959, the most that they could hope for being that they would hold their share of the market.

The trading profits for the year amounted to £1,594,000 (£1,620,000). The total dividend for the year was 10%.

A Visit to Rothamsted Experimental Station

The picture shows Mr. N. W. Pirie, Head of the Biochemistry Department of Rothamsted Experimental Station, offering to Mr. B. R. Sen, Director-General of F.A.O., and Mrs. Sen, biscuits made from leaf protein. On the right, an assistant, Mr. Peter Lamb, is putting young wheat into the "mechanical cow."

Cerebos trading profit up

The trading profit for the Cerebos group for the year ended December 31, 1958, amounted to £2,086,471, an increase of £191,899 over 1957.

The chairman of the group, Mr. W. Arnold Innes, said that a significant feature of the year had been an increase in the sales volume of every product. The results of Stamina Foods, Ltd., who make pet foods under the brand names of *Stamina* and *Paws*, were described as particularly satisfying.

The net profit for the after making all necessary allowances, amounted to £1,057,939. A final dividend of 12½%, less tax, was recommended, making a total for the year of 19¾%, less tax.

A.P.V. pays dividend

The profits for the year 1958 for the A.P.V. group of companies amounted to £368,599 before tax, an increase of more than £146,000. A dividend of 5%, less tax, was approved. For the previous two years A.P.V. had not paid a dividend on the ordinary share capital.

Birds Eye acquisition

Birds Eye Foods, Ltd., have purchased the entire share capital of the Times Food Products Co., Ltd., and of its subsidiaries. Mr. Ernest Velden, previously chairman and managing director of the Times Food Products Co., Ltd., will retain a seat on the board of that company.

Erections and Extensions

Messrs. J. Fontana are having an ice cream factory erected at King Street, Carlisle.

•

Robertson and Woodcock, Ltd., are planning to extend their factory at Brimington Lane, Chesterfield.

▪

J. Lyons and Co., Ltd., are having extensions built to their ice cream factory in Oldfield Lane, Greenford, Middx.

•

Richmond Sausage Co., Ltd., are planning to erect a single-storey extension to their factory at Spa Road, Bermondsey, London, S.E.16.

▪

Schweppes (Home), Ltd., are having a single-storey extension constructed at their mineral water factory in Killearn Street, Glasgow.

▪

William Teacher and Sons, Ltd., are having a wine and spirit bottling hall erected on a site at Flemington Street, Glasgow, N.1.

▪

Bloodworth and Son (Cheltenham), Ltd., grain merchants, 26-28, Albion Street, Cheltenham, are having a corn mill built on a site near Bouncers Lane, Cheltenham, Glos.

Food News Overseas

Faroes fish factory

A new frozen fish fillet factory has commenced production in the Faroe Islands. The factory, which has a West German filleting plant, should have a daily output of 10 tons of frozen fish fillet most of which is to be exported direct to the United States.

Colombian milk plant

The Municipality of Manizales in Colombia is negotiating for a loan of 1 million pesos from the proceeds of sales of United States surplus agricultural products for the construction of a modern milk plant.

Bolivian dried milk factory

The dried milk factory under construction in Cochabamba in Bolivia is expected to begin operation during July. It is reported to have a capacity of 1,500 litres of dried milk per hr. and a bottling plant with a production of 3,000 litres of pasteurised milk per hr.

Australian visit

The chairman of Foster Clark, Ltd., Mr. H. M. Beak, was spending July in Australia in consultation with the board of the Australian subsidiary company, Foster Clark (Australia), Ltd. The object of Mr. Beak's present visit is to examine development since that date with special regard to the expansion of the product range, and the rapidly changing constitution of the grocery trade in Australia.

Fisheries statistics meeting

An international meeting of experts on fishery statistics in the North Atlantic area is to be held in Edinburgh next September at the invitation of the United Kingdom Government.

The conference is being convened by the Food and Agriculture Organisation (FAO) of the United Nations in co-operation with the International Commission for the North-West Atlantic Fisheries and the International Council for the Exploration of the Sea. Governments concerned with the North Atlantic fisheries have been invited to nominate experts directly concerned with collecting, analysing and publishing statistics on the fishing industries and trades of their countries, and the Scottish Home Department will act as hosts to the delegates, of whom about 50 or 60 are expected to attend the conference.

Scandinavian frozen foods

A joint Scandinavian export company has been established for the marketing of deep-frozen foods under the name Findus International. The partners are Jalco in Denmark, Freia in Norway and Marabou in Sweden. An annual turnover of Kr. 35 m. is expected initially.

American wheat bureau at Rotterdam

The Great Plains Wheat Growers of the U.S.A. has opened a European bureau in the Grootandelsgebouw (Wholesalers' Building), Rotterdam.

This new bureau will advise bakeries all over Europe regarding the processing of hard American wheat in combination with the softer European varieties. It will also promote the study of wheat in universities by granting scholarships.

United Africa Co. not to buy cocoa in Ghana

The United Africa Company of Ghana, Ltd., is reported to have withdrawn from cocoa purchasing as licensed buying agents in Ghana. This decision is due to the fact that the return on the working capital as licensed buying agents has ceased to be satisfactory from the company's point of view. The withdrawal took effect from the closing date of the 1958/59 main-crop season. It is understood that the United Africa Company of Ghana, Ltd., previously bought about 16% of the annual total crop produced in Ghana.

W. European chemical industries

In view of the number and scope of the problems facing Western European chemical industries at the present time, the Austrian, Belgian, British, Dutch, French, German, Italian, Swedish and Swiss Chemical Manufacturers Associations have decided to improve their collaboration and contacts by setting up a Centre Europeen des Federations de l'Industrie Chimique (C.E.F.I.C.) the secretarial services of which are entrusted to the Swiss Association in Zurich.

C.E.F.I.C. is a working agency of the directors and will be responsible for organising their meetings and for the exchange of information. Contact with the centre will be solely through the directors of the member countries.

Dominican flour mill

A contract has been drawn up between the Dominican Republic Government and Compania Molinas Dominicanos for setting up and operating the first flour mill in the country. The firm besides producing flour from wheat will be concerned with the marketing of by-products.

New Rhodesian bacon factory

A new £250,000 factory for the Pig Industry Board is to be built in Salisbury, reports Barclays Bank D.C.O. Products of the factory will be bacon, sausages and canned meats. Building is scheduled to start in November, 1959, and it is expected that the factory will be in full production by June, 1961.

Overseas Enquiries

Canada: Fish oil extraction equipment

Mr. R. Earl, a representative of Sherwin Williams, Ltd., 110, Sutherland Street, Winnipeg, Manitoba, has a client who is interested in purchasing fish oil extraction equipment from the United Kingdom.

Sherwin Williams, Ltd., are considered to be a suitable connection for U.K. firms.

Interested manufacturers should write direct to Mr. Earl. At the same time, they should notify the U.K. Trade Commissioner, 403-504, Main Street, Winnipeg, Manitoba, that they have done so.

U.S.A.: Barley sugar

Mr. Edwin Wilmer of the Port Service Co., 510, East Lombard Street, Baltimore 2, Maryland, is interested in getting into touch with U.K. suppliers of barley sugar in 1 lb. packages for use as a lifeboat ration.

Port Service Co. are considered to be a suitable connection for U.K. firms.

Interested suppliers should write by airmail direct to Mr. Wilmer who would like to receive sample packages. It is important that quotations should show both f.o.b. and c.i.f. prices in U.S. currency.

Responding firms should copy their initial correspondence to the British Consulate, Commercial Section, Suites 611 and 612, Keyser Building, Calvert and Redwood Streets, Baltimore 2, Maryland, U.S.A.

New Companies

Animal Foods (Dorchester), Ltd. (626301.) Longmans Road, Dorchester. £5,000. Dirs.: Sidney and Mrs. Lily V. Lear.

By-Products (Keighley), Ltd. (627412.) Devonshire House, 9, Devonshire Street, Keighley. Cleaners and mnfrs. of products derived from animal offal, etc. £750. Subs.: Owen Potterton and J. W. Boocock.

Chocolate Fayre, Ltd. (626479.) 48, London Road, Braintree, Essex. Mnfrs. of and dlrs. in chocolate, confectionery, sweets, etc. £100. Dirs.: John E. Wyand Brooks and Mrs. H. E. Wyand Brooks.

Croydon Food Products, Ltd. (626835.) 44, Cherry Orchard Road, Croydon, Surrey. £100. Dirs.: Thomas P. and John P. Coughlan and Mac Edward Jeal.

Stewart Ettinger and Partners, Ltd. (626893.) "The Anchorage," Dormans Park, East Grinstead. Mnfrs., preservers and canners of and dlrs. in jams, etc. £1,000. Dirs.: Stewart A. and Mrs. Beryl M. Ettinger.

Food Machinery Agency (Manchester), Ltd. (626527.) 175, Shaftesbury Avenue, Timperley, Ches. £1,500. Dirs.: Stanley E. Renshaw and Harold Mayer.

V. D. Harris (Bakers), Ltd. (627764.) £1,000. Victor D., Sarah A. and Terence V. Harris. Subs.: Geo. A. Crook, 51, Caversham Road, London, N.13, and Emily Faulkner.

Hempsted Dairies, Ltd. (626982.) 4, Station Road, Gloucester. £5,000. Dirs.: Lancelot W., Edith F., and Geoffrey M. Mann.

Hetherington (Bakers), Ltd. (626936.) 76, Wigtown Road, Carlisle. To take over the bus. of baker and confectioner carried on at Carlisle by Robt. M. Hetherington, etc. £4,000. Dirs.: Robt. M. and Patricia Hetherington.

V. J. Hunter, Ltd. (627333.) 22, Market Place, Hull. Mnfrs. of and dlrs. in confectionery, chocolates, sweets, ices, cooked and prepared foods, etc. £5,000. Dirs.: Vivian J. and Mrs. Louie P. Hunter and Roy Wilburn.

L.B.L. (Cooked Meats), Ltd. (626616.) 16, Rick Street, Nottingham. £15,000. Dirs.: Harold and Eric H. Smith.

Meyer Liquid (Holdings), Ltd. (624194.) To acquire the whole of the issued share capital of Meyer Liquid, Ltd., and Meyer-Dumore Bottlers' Equipment, Ltd., and to carry on the bus. of mnfrs. of and dlrs. in bottling and brewing machinery, etc. £404,316. Dirs.: Geo. L. N. and Harold W. Meyer, both of Milwaukee, Wisconsin, U.S.A., Geo. L. N. Meyer, Jr., C. P. and A. P. E. Bennett.

Mr. Whippy, Ltd. (624641.) 3, Newhall street, Birmingham, 3. Mnfrs. of and dlrs. in ice cream, etc. £100. Dirs.: J. J. and Stella P. J. Facchino.

Mixer Hire, Ltd. (625196.) To carry on the bus. of mnfrs., distributors and hirers of mixing machines, chemical, food and fodder mixers, etc. £100. Subs.: Ronald W. Cox, 294, Harrow Road, Wembley, Middlesex, and R. F. Pegler.

Mitchell and Broadbent, Ltd. (625605.) Brierley Hill Works, Beacon Hill Road, Halifax. Fat refiners, tanners, curers, etc. £20,000. Permt. dirs.: John, Harry and Dyson Mitchell.

Pettfish, Ltd. (626236.) 19, Fenchurch Street, London, E.C.3. Mnfrs. of and dlrs. in animal foods and food products, etc. £100. Dirs.: C. F. Windrow and Maurice Haddon-Grant.

Savrianaks, Ltd. (624105.) The Offices of Fenton's Secretarial Services, 10-16, Park Street, Bristol, 1. To carry on the bus. of mnfrs. of, and dlrs. in, delicatessen, preserved, prepared and other foodstuffs, etc. £3,000. Dirs.: Ada A. Abel, Maude A. Levell and Sylvia I. J. Fenton.

Sevenex Bakeries Nominees, Ltd. (624569.) £100. Subs.: Stanley L. Turner, 4, The Parade, Claygate, Surrey, and J. W. D. Harrison.

Tasties of Plympton, Ltd. (624433.) Fore Street, Ridgeway, Plympton. Mnfrs. of and dlrs. in cooked meats, etc. £1,500. Permt. dirs.: Mrs. Doreen M. and Daniel J. Ebsworthy.

Warner and Clark, Ltd. (624111.) 17, Abbey Street, Rhyl. To take over the bus. of confectioners and bakers carried on as "Warner and Clark" at 17, Abergele Road, Colwyn, and 17, Abbey Road, Rhyl. £3,000. Dirs.: John I. and Celia G. M. Clark and E. T. Jennings.

These particulars of new companies recently registered have been extracted from the daily register of Jordan and Sons, Ltd., Company Registration Agents, 116, Chancery Lane, London, W.C.2.

New Scottish Companies

Britovo Egg Products, Ltd. (32571.) Farmers, egg and produce merchants. £10,000. Dirs.: David D. Curr, B.SC., and Robert L. MacDonald.

Capital Services (Peat Control), Ltd. (32524.) 131, West Regent Street, Glasgow. £3,000. Dirs.: H. C. Crawford and J. L. Steel.

Duggan's Dew of Kirkintilloch, Ltd. (32548.) Brewers, distillers, blenders, etc. £10,000. Subs.: Jean W. Barclay, Barrholm, Kilbirnie, and Margaret C. Dunlop.

Glenturret Distillery, Ltd. (32539.) Bridge of Allan. Distillers, bonders, blenders, etc. £100. Subs.: James and Joan C. M. Fairlie.

James A. Gibson and Co. (Cowgrove), Ltd. (32597.) 58, Alloway Street, Ayr. Millers, etc. £10,000. Dirs.: J. A., Elizabeth D., and J. A. Gibson, jr.

S. Levine (Whisky Brokers), Ltd. (32584.) 38, Bath Street, Glasgow. Brewers, distillers, etc. £5,000. Dirs.: S. and Rosie Levine.

James P. Loudon, Ltd. (32619.) 34, Spoutmouth, Glasgow. Mnfrs., curers and smokers of bacon and ham, and dlrs. in cooked, cured and preserved meat, fish, poultry, game, etc. £20,000. Dirs.: James P. and Mrs. Sarah B. Loudon.

W. H. S. Macdonald, Ltd. (32562.) 21, Dallingburn Street, Greenock. Mnfrs. of and dlrs. in baking powder, bone oil, animal charcoal, etc. £7,200. Dirs.: R. J. G. and A. V. Macdonald and J. G. Kerr.

Mellow Confectionery (Manufacturing) Co., Ltd. (32612.) Makers of and dlrs. in chocolate, cocoa, confectionery, biscuits, bakery products, etc. £1,000. Dirs.: Not named. Subs.: John Don Francesco, 45a, Dalrymple Loan, Musselburgh, and Lawrence Ambrose.

Sugar Stores (Bowden), Ltd. (32596.) Sugar mnfrs. and refiners. £5,000. Subs.: D. T. Muir and C. M. Stuart both of 8, Gordon Street, Glasgow.

Trade Marks

BARTEE SUN DRENCHED.—B768,763. Fruits and vegetables, all being canned, bottled or dried. **Bartee Inc.,** 303, Columbus Avenue, San Francisco, 11, California, U.S.A.

LEAGUE.—781,064. Bubble gum, being chewing gum. **A. and B. C. Chewing Gum, Ltd.,** 1, Carlisle Road, London, N.W.9.

CYMBAL.—784,792. Biscuits (other than biscuits for animals). **Symbol Biscuits, Ltd.,** Sunya House, Scrubbs Lane, Willesden, London, N.W.10.

MIVVI.—785,839. Ice cream, ice cream confections, mixtures for use in making ice cream and water ices. **J. Lyons and Co., Ltd.,** Cadby House, London, W.14.

KATKINS.—B781,672. Food for cats. **Petfoods, Ltd.,** Melton Mowbray, Leics.

TOBLER FAVORI.—780,495. Chocolates, chocolate and non-medicated confectionery. **Chocolat Tobler, Ltd.,** 20, Soho Square, London, W.1.

YAFFLE.—785,300. Chocolate, chocolates and non-medicated confectionery. **W. and M. Duncan, Ltd.,** 27, Beaverhall Road, Edinburgh.

"THE GREAT DANE."—777,528. Canned meat. **Schaub and Co.,** A.m.b.A., Flaesketorvet 33-37, Kodbyen, Copenhagen, Denmark.

SMEDLEY'S.—774,042. Poultry, meat, fish; and meat products and fish products, all for food; all being canned or frozen goods. **Smedley's, Ltd.,** Godstone Road, Whyteleaf, Surrey.

EASTERN GLORY.—780,411. All goods in Class 29, but not including cheese, beef, mutton, lamb or meat offal or any goods of the same description. **William C. Watkins, Ltd.,** Commercial Sale Room, Winchester Square, London, E.C.1.

TRITON.—780,413. Canned salmon. **George Richard Cole** and **George Leonard Cole** trading as **G. R. Cole and Co., Ltd.,** 28, St. Martin Lane, Cannon Street, London, E.C.4.

SEA CHIEF.—785,216. Fish (other than live fish) and fish products (for food). **J. Jangaard, Ltd.,** 25, Monument Street, London, E.C.3.

BLEEP.—770,025. Confectionery (non-medicated). **Robert R. Miranda, Ltd.,** 80, Queens Road, Peckham, London, S.E.15.

HONEYSUCKLES.—784,147. All goods included in Class 30. **W. and M. Duncan, Ltd.,** 27, Beaverhall Road, Edinburgh.

BUNKHOUSE BAR.—784,503. Chocolate and non-medicated confectionery, all in the form of bars. **The Nestlé Co., Ltd.,** Hayes, Middlesex

HAPPY.—784,666. Pudding mixtures. **Van Den Berghs and Jurgens, Ltd.,** Unilever House, Blackfriars, London, E.C.4.

CARNIVAL.—786,532. Edible oils and edible fats. **Van den Berghs and Jurgens, Ltd.,** Unilever House, Blackfriars, London, E.C.4.

MOORES LUXURY LOAF.—770,193. Bread for sale in Lancs., Ches., and Yorks. **Wm. Moore and Sons, Ltd.,** Highfield Road, Salford, 6, Lancs.

New patents are from the Journal of Patents and new trade marks are from the Trade Marks Journal. In each case permission to publish has been given by the Controller of Her Majesty's Stationery Office. Each of the publications is obtainable from the Patents Office, 25, Southampton Buildings, London, W.C.2.

Packaging

Packaging service

A new packaging service aimed specifically at the smaller firm making certain types of food products, has been introduced by Evans of Elstree.

Small manufacturers approaching the company will receive advice on pack suitability, with special emphasis on tubes and bottles, and the firm say that reasonably small batches will be executed at moderate rates.

The company does not undertake the actual production of food products, but is equipped to package them from bulk supplies, the food packaging floor being completely segregated from the remaining factory area to ensure the utmost cleanliness and hygiene. The consultant services of Mr. R. W. D. Carr, an expert in this type of packaging, have been retained to advise manufacturers.

Polony casing

Viskase, Ltd., have introduced a new red *Nojax* casing specially for the manufacture of polonies. This can be printed and is available in several forms.

The same diameter as the largest size standard *Nojax*, 1¼ in., this new casing has a rich red colour. It can be supplied in 40 ft. lengths ready-shirred for continuous dry stuffing, or in flat lengths.

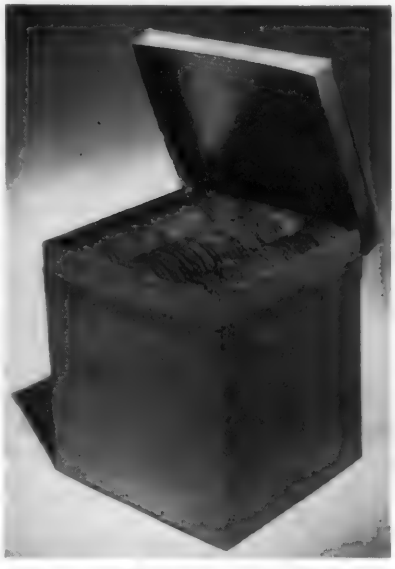
This new casing gives a regularly shaped product and eliminates any need for dyeing. Each link is of a standard size and the food displays well in the retailer's cabinet.

"One-trip" biscuit boxes

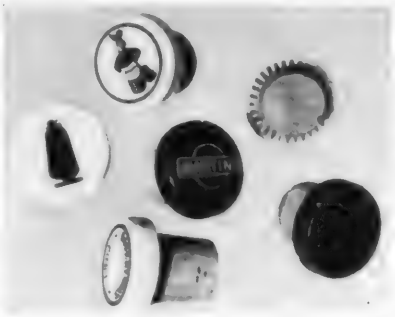
Aluminium foil-lined corrugated fibreboard boxes costing less than 10d. each have been released by Bowater-Eburite, Ltd., in trial quantities to the biscuit trade. The boxes are designed to hold about 9 lb. of loose biscuits and to provide an economically acceptable one-trip alternative to returnable tinplate containers. They are said to give a shelf-life of more than three months: under accelerated tests simulating 12 weeks of the worst possible British weather conditions, biscuits were found to have absorbed only 1·5% moisture above oven weight.

Bowater-Eburite, Ltd., have designed the body of their new box so that the composite barrier of 0.009 m.m. aluminium foil and corrugated fibreboard is unbroken. The bottom flaps are not slit but merely scored; when folded in and sealed with ordinary gummed kraft paper tape they offer no cracks or slits through which moisture can penetrate. Similar precautions have been taken with the lid, a foil-lined chipboard construction with small flaps which fit snugly over the rim of the box. This again is sealed on with gummed kraft tape.

No additional packing is needed, although strips of moisture-resistant tape are applied at the corners to ensure that possible fissures in the foil-corrugated board laminate do not interrupt the water vapour barrier.



Non-returnable corrugated fibreboard biscuit boxes lined with aluminium foil designed by Bowater-Eburite, Ltd., to hold about 9 lb.



Examples of a polystyrene-headed bottle stopper introduced by the Viscose Development Co., Ltd., claimed to be inert, water and spirit proof, odourless and resistant to swelling or shrinking.

Bottle stopper

A polystyrene-headed stopper has been introduced by the Viscose Development Co. who say that the head is inert, guaranteed impervious to water and spirits, cannot swell or shrink and is odourless.

An adhesive, formulated for the stopper, is said to ensure that the head cannot be separated from the cork stopper unless the cork is split or broken.

Product names and company trade marks can be effectively produced on the polystyrene head. The trade mark or product name is readily identifiable by the purchaser and cannot be erased by handling.

The polystyrene head is available in a variety of colours and the embossing can be coloured gold or in contrasting ink colours. Tooling for the engraving costs about £25. Thereafter, Viscose claim that the price of the stopper is competitive with wood and metal topped stoppers.

The stoppers can be sealed with *Viskrings* which shrink to fit the outline of the bottle neck.

Biscuit foil wrap

C. H. Elkes and Sons, Ltd., are now marketing their *Choc-o-Doodle* sandwich biscuit in a new aluminium foil wrap produced by Venesta, Ltd.

The wrap is composed of ·009 mm. foil wax-backed to an 11¼ lb. D/C tissue, having a finished wax weight of 15 lb.

Featuring the company and product names, the foil is printed in three sets of three colours: blue, cream and red on silver; red, blue and cream on silver; and green, red and cream on silver.

The biscuits are packed into counter display cartons of 48 (16 of each colour wrap) for distribution throughout London and the provinces.

Collapsible aluminium containers

Collapsible aluminium containers are being marketed by Tracons, Ltd., who say that *Tracon* containers are ideal for the transportation of goods of all types.

The *Tracon* container is made from aluminium alloy sheet and has steel reinforced corner pieces. It is hinged along the entire length and breadth of each collapsible side and has locking clips riveted to the structure. Packed, the containers are said to defy the most determined pilferers; empty, the sides collapse to form a compact package only a fifth of the packed size. They are

made in four sizes from 24 in. × 12 in. × 12 in. with a capacity of 2 cu. ft. to carry a load of 220 lb., up to 50 in. × 24 in. × 24 in. with a capacity of 16½ cu. ft. to carry 330 lb. Empty, the smallest size weighs 21 lb. and the largest 62 lb.

The material used in the containers is supplied by Reynolds T.I. Aluminium, Ltd.

Cake mix

Fairy cakes are the latest addition to the range of *Mary Baker* cake mixes marketed by Nabisco Foods, Ltd.

The fairy cake mix pack includes film-wrapped fruit and 16 paper cases. The housewife has only to add an egg to make 16 cakes in 15 min.

Carton order

Haven Foods, Ltd., have placed with the Metal Box Co., Ltd. what is believed to be the largest single order for rice cartons ever made in this country. It is for over 3 million cartons in three different versions of the same design. There are 1 lb. and 8 oz. sizes for selected rice and both are printed predominantly in a blue, check pattern. The brand name is in white on a red panel and a description of the rice is printed in blue on a grey background. The other kind is 1 lb. Patna rice, and here the blue is replaced by dark green, to make for easier identification. On all three packets there is a small panel carrying a picture of the type of rice they contain, and rice recipes are printed on the back and on one side of each carton.

Award-winning pack

A new wrapper, one of a range designed and printed on *Fiberseal* by the Robinson Waxed Paper Co. for Bolands' biscuits, has won an award of £100 from the Arts Council of Ireland for outstanding package design.

The prize-winning pack, which is printed in four colour gravure, carries a highly realistic reproduction of the contents on an attractive blue-grey ground, with the name and description in maroon. It was described by the council as creating a "relaxed feeling."

Fiberseal is an RWP proprietary paper laminate used in this instance as a highly protective wrapper around a corrugated greaseproof skillet.

Packing roast chicken

J. Lyons and Co., Ltd., are now selling roast chicken which, after cooking, is packed immediately into heat-resistant bags made from high density polyethylene. Packed in this way the roast chicken remains hot for a considerable period and can be served from the bag without the need for warming up.

The chicken is served straight from the bag, complete with fat, gravy, natural food juices and so on, which

Sixteen paper cases are included in every package of Mary Baker Fairy Cake Mix marketed by Nabisco Foods, Ltd.

are completely preserved within the pack. This means that no pans or utensils are soiled and the use of an oven is unnecessary. The introduction of these bags by Lyons is said to have been made possible by the use of *Rigidex* high density polythene, which is impermeable to oils and greases and has good temperature resistance. It is marketed by British Resin Products, Ltd.

Heat resistant bags made from "Rigidex" polyethylene supplied by British Resin Products, Ltd., are used for packing roast chickens marketed by J. Lyons and Co., Ltd.

Container firm sold

A controlling interest in Perga Cartons, Ltd., a wholly owned subsidiary of Mono Containers, Ltd., has been sold with effect from July 1 to Bowater Paper Corporation, Ltd., and the name of the company will be changed to Bowater Perga, Ltd.

Perga make cartons for milk, fruit juices and other food products.

Sales record for Metal Box

The total sales and investment income for Metal Box Co., Ltd., for the year ended March 31, 1959, rose from £76·3 million to £76·8 million, £57·8 million of which came from the home group and £19 million from overseas. The dividend for the year is being raised from 11% to 13% and a 1-for-2 scrip is proposed.

Biscuit pack

The coconut cream biscuits made by Meredith and Drew, Ltd., are now being presented in a new pack of their own.

These golden-crisp biscuits with a coconut cream filling sell at 1s. 3d. a packet and are available in 18-packet non-returnable outers. The *Diolam* wrapper incorporates the features common to the range of Meredith and Drew packs.

Shell cakes

Chocolate shell cakes called *Showboat* are being marketed by C. Kunzle, Ltd.

The cakes themselves are assorted in four different styles, each pack holding 3 doz. cakes, 9 of each particular type.

The pack itself is a display unit printed in six colours by Fields of Bradford and the layer cards and divisions are printed in a matching blue to tie up with the background colour of the pack.

The cakes sell at 6d. each.

Board-backed window bags

A new type of window bag with a backing of board or card instead of the paper backings hitherto available, has now been introduced by E. S. and A. Robinson, Ltd. Supplied in a wide range of sizes, the bag can have its front panel made full-width from *Cellophane* film, printed by any of the normal processes.

The bag is machine-made with a board base, film gussets and face. This film overlaps the board at top and bottom, offering film walls to the rigid base. The overlap of film at the top can be folded back over the board and then sealed with a *Therm-o-Top* closure. If required, the board base can be protective-coated on the inside of the bag.

Recent Patents

COMPLETE SPECIFICATIONS ACCEPTED

813,731. G. FIORANTI trading as D. FIORANTI: Food products.
813,737. J. A. BENCKISER G.M.B.H. CHEMISCHE FABRIK: Method for providing unripe cheese with a protective coating of synthetic foil.
814,208. SCRIBBANS-KEMP, LTD.: Discharge of wafers from wafer-baking machines.
814,241. DAIRY SUPPLY CO., LTD.: Apparatus for applying closures to cartons.
814,444. ALEXANDERWERK, A.G.: Meat-mincing machines.
815,597. PILLSBURY MILLS, INC.: Dry process of fractionating milled cereal stocks.
815,733. T. COLLINS AND CO., LTD., and A. T. COLLINS: Baking ovens.

ABSTRACTS OF BRITISH PATENTS

Drinking straws

A drinking straw is described for flavouring certain liquids, such as milk, which pass through, which contains a flavouring element narrower than the straw and adhesively attached. Paraffin wax is stated to be a suitable adhesive and in one embodiment the end of the element is at the end of the straw. Apparatus for making these drinking straws is also described.—812,661. *Morley Freedman.*

Vegetable and fruit peeler

The invention concerns a device for removing the skins from vegetables and fruit which is supplied with tap water to operate it. A hollow casing is provided which has an outer surface with a number of cutting edges adjacent to perforations communicating with the interior of the casing. Means are also provided whereby the interior of the casing may be continuously supplied with water and, through the perforations, the cutting edges.

The cutting edges may be formed in the perforating of the casing.—810,229. *Thos. M. Nutbrown, Ltd.*

Beverage machine

The invention provides a disposable brewing container for use in beverage brewing and dispensing machines. The container, inside which is a quantity of material for making the brew, has a tubular side wall portion and a top portion extending across and secured to one end of the tubular side wall, the top portion having at least one opening therethrough. A perforated plate extends across the other end of the tubular side wall and is permanently secured to it. The opening or opening in the top portion and the plate perforations are in operative position within the apparatus.

The invention also provides an apparatus for preparing and dispensing beverages which incorporates the container. Two sheets of diagrams illustrate the specification.—810,371. *United Coffee Corporation (U.S.A.).*

Edible sodium chloride composition

An edible sodium chloride composition which has superior storage properties is described, which is stabilised against the absorption of moisture, and which comprises an edible grade of sodium chloride and a small amount of finely divided sodium aluminium silicate having a particle size below 0·1 micron and a surface area of 10-200 sq. m. per g. Analyses of preferred sodium aluminium silicates are given and an addition of 0·5-1% by weight is recommended.—813,164. *Columbia-Southern Chemical Corporation.*

Emulsions of phosphatides in alcohol

A process is described for the preparation of an emulsion of a phosphatide in aqueous alcohol containing a carbohydrate such as a mono-, di- or poly-saccharide, to obtain emulsions suitable for use in chocolate manufacture, which comprises incorporating in the emulsion 0·5-5% of a neutral fat based on the weight of the phosphatide. The fat can be incorporated by direct addition during the formation of the emulsion or by using as starting material a phosphatide which has been incompletely defatted.—813,213. *Carl Heinz Buer.*

Packaging and distribution of fish

A method is described for packaging fish and in particular a kipper, in which the fish is packed in a wrapper together with a piece of a material such as cardboard for support, the fish being secured to the support either by passing its head and/or tail through a slot in the support, or by non-corrosive staples. For distribution, these packaged fish may be packed vertically in layers and, as a result of the use of the support, the lower layers are not deformed or crushed by the dead weight of the upper layers.—813,341. *Maconochies' Kippers, Ltd.*

Electric oven temperature regulators

A thermostat is described for an electric oven having at least two heating elements, which comprises a main thermostat controlled by the oven temperature and a subsidiary control for the heating element at the top of the oven which is governed by the position of the main regulator control.—813,356. *Elcalor A.G. Fabrik.*

Vegetable fat for margarine

A fat suitable for use in margarine compounding, which consists of either a physical mixture of or the product of interestifying a mixture of (*a*) a glyceride oil of the coconut oil group, (*b*) 1-15% lower fatty acid glycerides, and (*c*) 1-15% palmitic acid glycerides, is described. It is stated that these fat compositions are suitable for preparing margarines which have excellent taste and flavour, which retain a butter-like plasticity at refrigerator temperatures, and which possess a butter-like gradual melting at body temperature. It is further stated that the coconut oil glyceride can be hydrogenated either before or after compounding.—813,402. *Ernest Francis Drew.*

Extracting sugar from sugar cane

A continuous process is described for extracting sucrose from sugar cane at very high yields (98% or more) and with low impurity levels, which comprises passing a suspension of chopped sugar cane in a sugar-bearing juice countercurrent to a warm water stream in a vertical tower, recycling part of the sugar-bearing juice from the bottom of the tower to form fresh cane-suspension, and drawing off the remaining sugar-bearing juice. For satisfactory results, the chopped cane pieces should be no longer than their diameter.—813,394. *National Cylinder Gas Company.*

Separation of protein

A process is described for separating protein from materials such as oil-free groundnut meal which comprises extracting the protein with aqueous alkali at a *p*H below 10, separating and acidifying the extract to obtain a protein-suspension, and before concentrating this suspension, for example, by centrifuging, adding to the aqueous medium an alkali metal chloride such as sodium chloride, in order to lessen the formation of gritty protein particles in the slurry and thus reduce the tendency of the slurry to block the separating device.—813,434. *Unilever, Ltd.*

Notes for Contributors and Authors

The Editor of FOOD MANUFACTURE welcomes articles, news items and other contributions on all aspects of food production.

The purpose of this journal is to exchange information between all those concerned in the food industry. Articles should therefore be written in a readable style, avoiding esoteric terminology and technical jargon, and should contain factual and practical information.

A preliminary synopsis should, preferably, be sent to the Editor, and the contribution itself should be typed in double spacing on one side of the paper only. It should bear the name and address of the author and should be accompanied by photographs suitable for illustrations.

Abstracts of British patents have been taken from published specifications by permission of the Controller, H.M. Stationery Offices. The full specifications are available from: The Patent Office, 26, Southampton Buildings, London, W.C.2. Price 3s. 6d.

Number 12 August 1959

Hydrogenation (No 1)

LODERS and NUCOLINE LTD.

INFORMATION BULLETIN

This advertisement is one of a series of Information Bulletins issued by Loders & Nucoline Ltd. Copies are available, together with a folder, on request to Loders & Nucoline Ltd., Unilever House, London, E.C.4.

MANY edible oils which are liquid may be hardened and have their melting points increased to improve their texture and consistency.

Neutral oils are glycerides of various fatty acids, and these may be *saturated* or *unsaturated*.

The unsaturated acids have lower melting points than the saturated ones, and may be converted to saturated acids by combining with hydrogen.

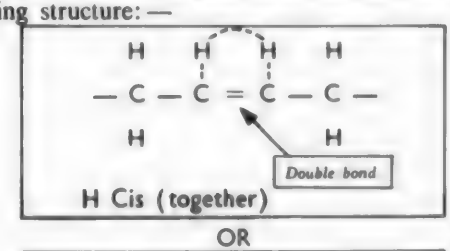
Thus, the degree of hardening which may be effected is governed by the amount and type of unsaturated acids present in any oil.

For most edible oil requirements, partially hardened oils are used and the relationship between texture, plasticity, and melting point is of great importance. In order to understand how these are manipulated, it is necessary to understand the chemistry of the reaction.

THE CHEMISTRY OF HYDROGENATION

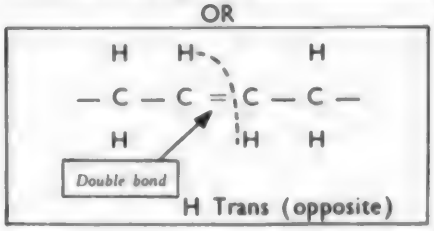
Fatty acids have long chains of carbon atoms (each having four bonds) to which are attached hydrogen atoms.

An unsaturated acid chain has the following structure: —



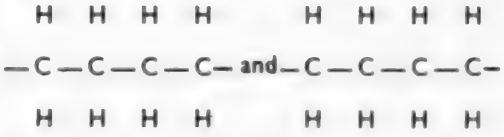
H Cis (together)

OR



H Trans (opposite)

These double bonds between carbon atoms combine with hydrogen to form saturated acids: —



which are virtually the same, whether from 'cis' or 'trans' unsaturated acids.

A di-unsaturated acid contains two such double bonds and a tri-unsaturated acid three.

When hydrogenation commences, the tri-unsaturated acids are converted to di-unsaturated acids and then mono-unsaturated acids, and finally to saturated acids. At the same time, the existing di-unsaturated acids are converted to mono-unsaturated and then saturated, whilst the existing mono-unsaturated are converted to saturated acids.

If all these processes occur together, the process is 'non selective', whereas if the tri-unsaturated acids are hydrogenated preferentially, followed by the di-unsaturated etc. the process is 'selective'.

Depending upon the type of reaction taking place in the intermediate stages a semi-hardened oil will have different characteristics, but of course all completely hardened oils will have all acids saturated and will finish up with the same characteristics.

In addition the 'cis' and 'trans' acids may change formation from one to the other, and the double bonds in unsaturated acids may change their relative position in the chain, forming 'iso' unsaturated acids.

These changes also effect the physical characteristics of any semi-hardened oil, but to a lesser degree than selective and non-selective hardening.

LN 55-8058

Versatility

BEER IN CANS... another new use for tinplate

Tinplate is changing the traditionally conservative habits of beer-drinkers. Already in Britain no fewer than nineteen leading brewers are packing thirty-four brands of beer in cans.

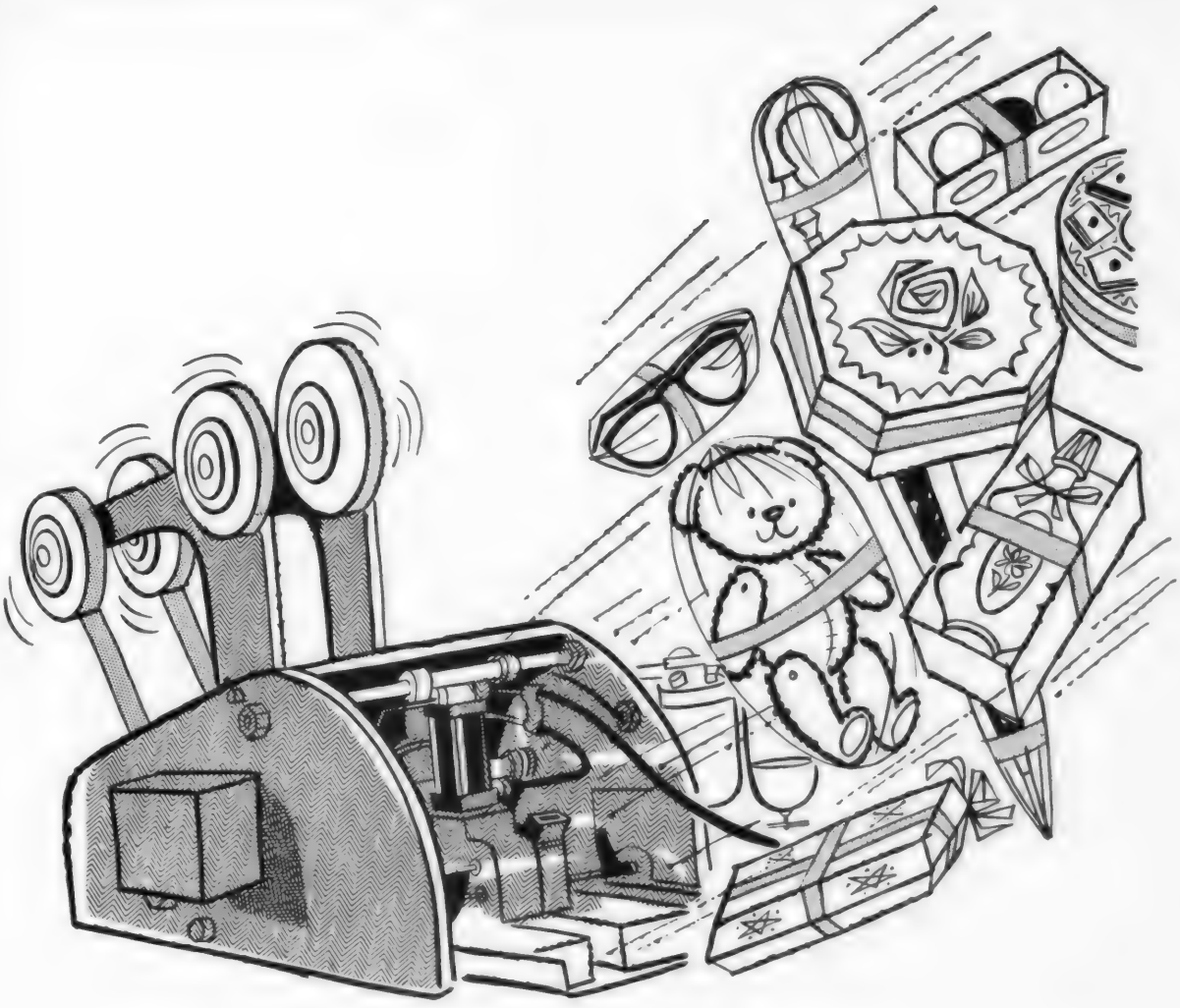
Research and development by The Steel Company of Wales have helped to make possible this further example of tinplate's increasing versatility. In addition to the special type of tinplate required for canning beer, The Steel Company of Wales produces a wide variety of grades and qualities to suit many specialized applications.

Satisfying more than two-thirds of Britain's needs has taught us a great deal about tinplate. Why not write to us? There are several interesting developments you may not know about.

TINPLATE DIVISION

THE STEEL COMPANY OF WALES LIMITED

Carmarthen Road, Swansea, Glamorganshire Telephone: Swansea 51571 Telegrams: Welshplate, Swansea



MACHINES THAT SEAL ALMOST ANYTHING!

The Lassotape Machinery Service offers a complete range of speedy sealing machines. Manually operated dispensers, semi-automatic and fully automatic machines that can seal almost every shape, size and type of container. Lassotape sealers are not only quicker—they're *surer;* they give a consistently better seal than could possibly be achieved by hand.

If you would like to see these machines and have the advice of a package sealing expert, write, without obligation, for our travelling demonstration unit to visit you.

LASSOTAPE MACHINERY SERVICE

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WILLIAM BRYAN LTD.

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MACE, NUTMEGS, GINGER, CINNAMON, ETC.

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FOR EVERY PURPOSE

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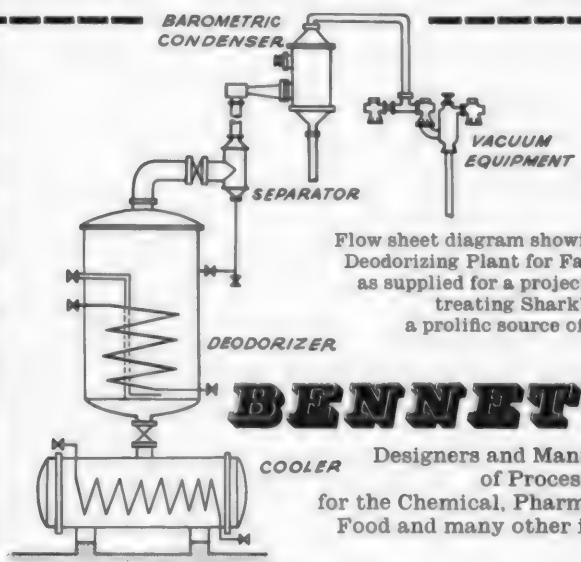
Telephone: Epsom 9652
EST. 1835

THE VITAL LINK!



Flow sheet diagram showing Bennett Deodorizing Plant for Fats and Oils, as supplied for a project in Ceylon, treating Shark's Liver Oil, a prolific source of vitamin A.

BENNETTS

Designers and Manufacturers of Processing Plant for the Chemical, Pharmaceutical, Food and many other industries.

Equipment available in Stainless Steel (all grades), Mild Steel, "Monel" Metal, Copper, Nickel, Aluminium etc., and, if desired, with plastic or rubber lining.

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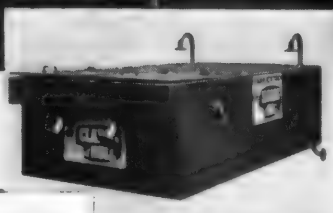
Stainless steel vessel with mild steel jacket

1,000 gall. kettle in ½" copper. Lynx Quasi-arc welded.



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Clarks offer you a unique combination of the most advanced equipment and methods with a century-old reputation for high craftsman standards on every type of fabrication work.

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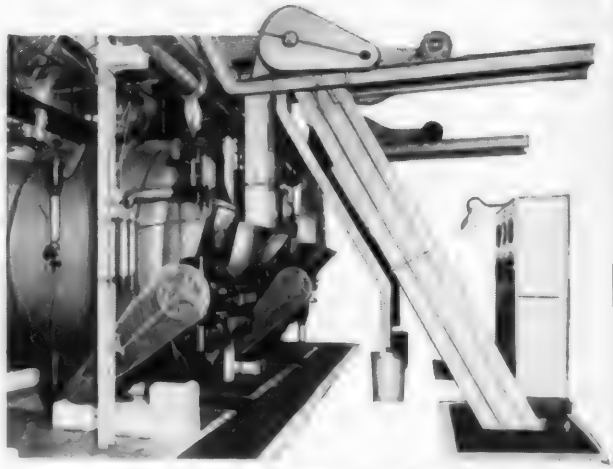

Hodgkinson "Low Ram" Stokers and Fuel Blending Elevators with Full Automatic Control

Full Automatic Control

FOR THE

HODGKINSON "LOW RAM" STOKER

Full Automatic Control ensures efficient smokeless combustion with a wide variety of coal. Automatic adjustment of air supply to suit rate of firing maintains maximum CO_2 at a steady boiler pressure or temperature irrespective of load variations. A comprehensive control system with a wide turndown ratio can be installed with minimum alteration to both new and existing plants.

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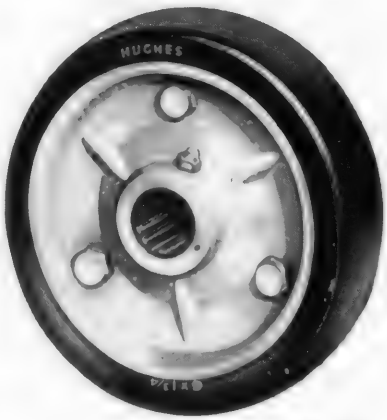

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The design incorporates a conveyor belt principle enabling all types of paste to be handled at a speed greatly exceeding that of the fixed table type.

The necessity for handling the paste is avoided, as the paste is carried to and from the rollers by a conveyor belt. A special feature is the ease with which short pastry can be handled.

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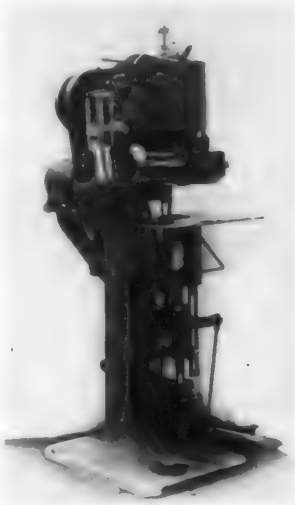

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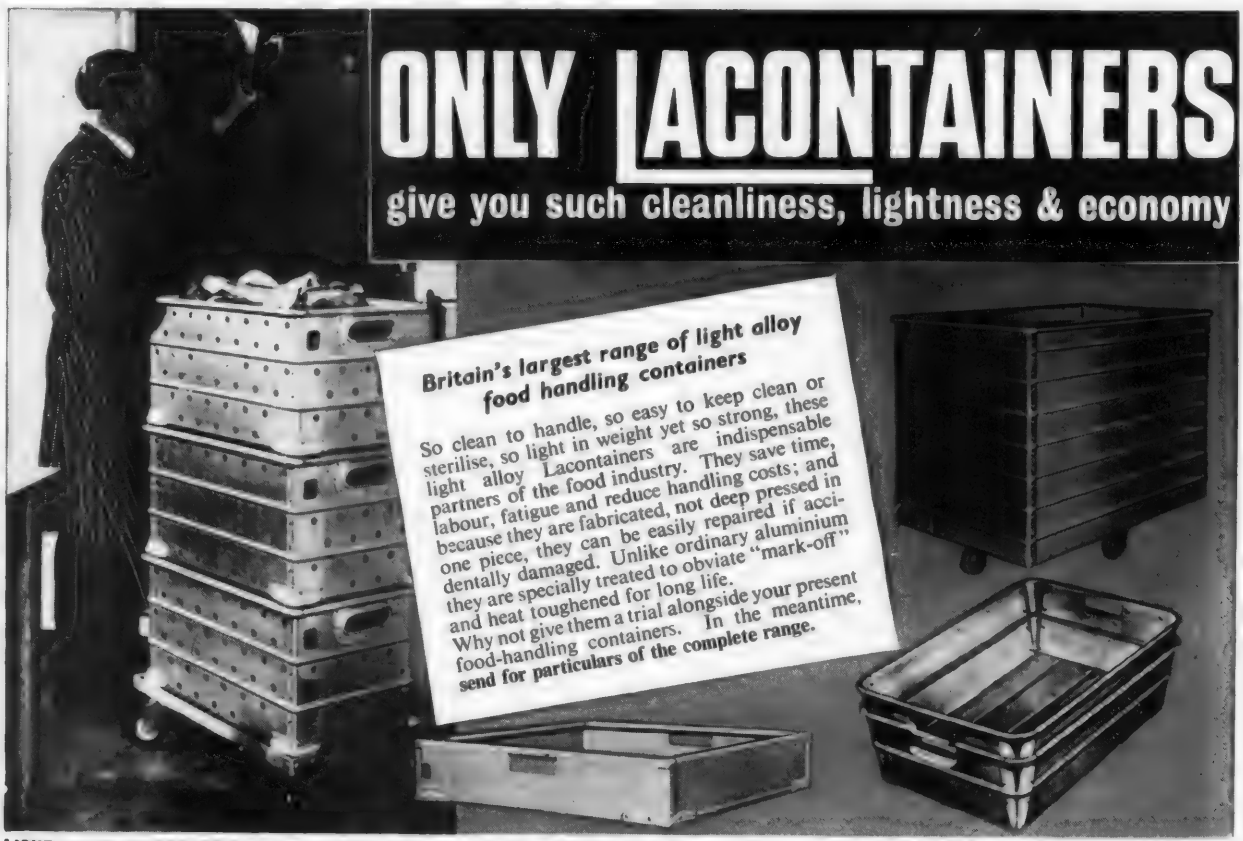
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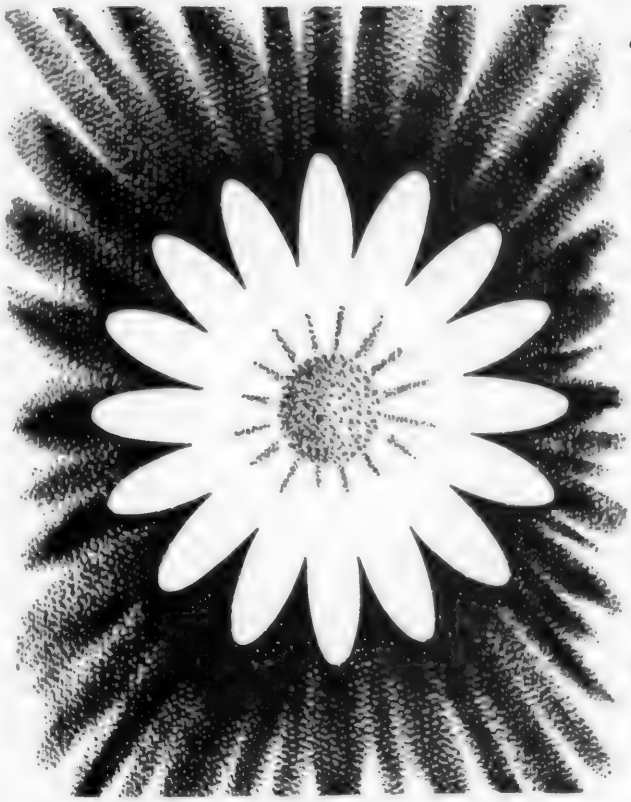

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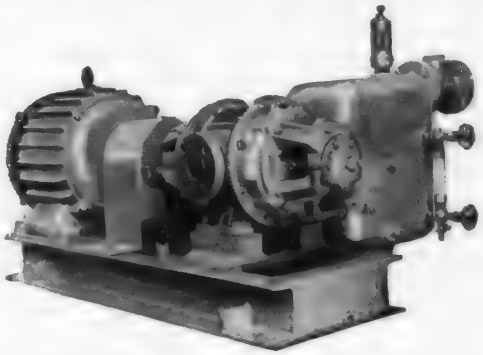

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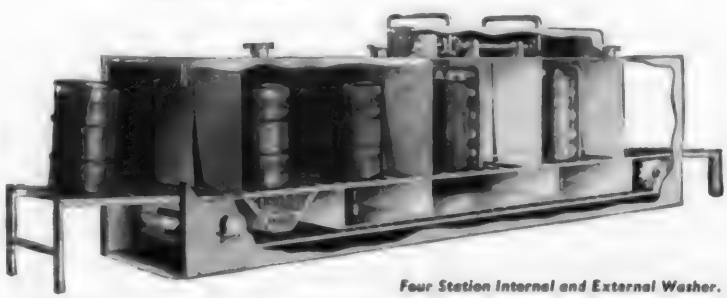

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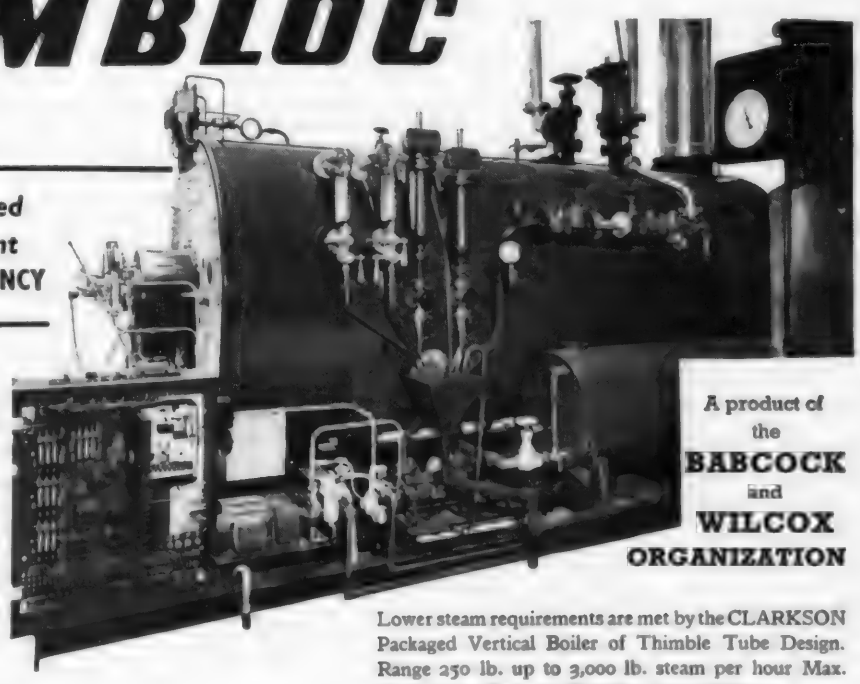
Fully Automatic — Oil Fired
High Efficiency Boiler Plant
GUARANTEED 82·5% EFFICIENCY



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Send for Publication No. 1628/3—The Steambloc Packaged Boiler.

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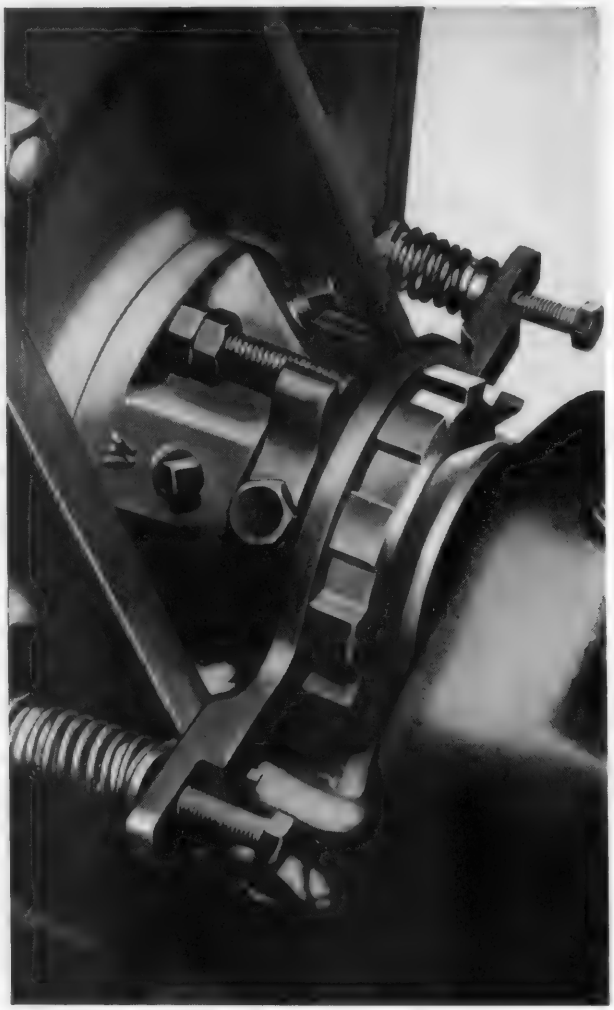

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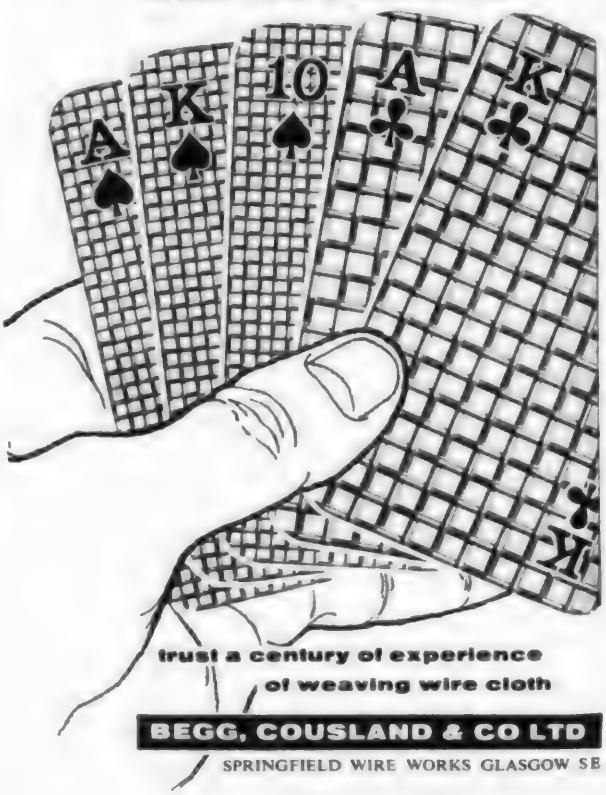

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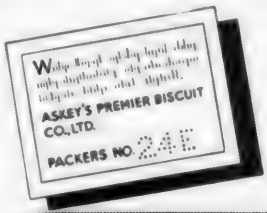

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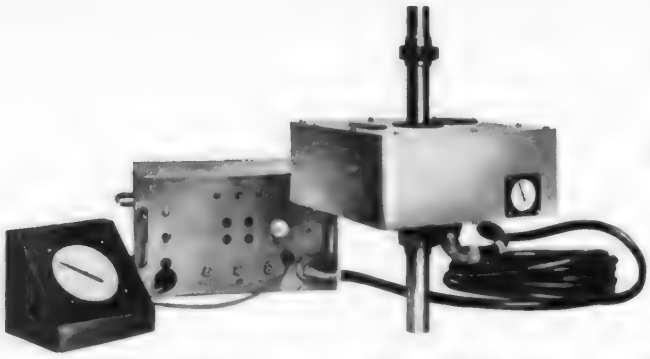

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(*f*) Have a keen awareness of hygiene, in which connection a background of chemistry and technological experience would be an asset.

If you feel that you can handle this position which is permanent, progressive and pensionable, please address your application, giving fullest information to Box B5865. *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1. All applications will be acknowledged.

T. WALL and Sons (Ice Cream) Ltd., have a vacancy for a Senior Scientist in their Research and Development Organisation. Applications are invited from men having a good honours degree in Physics or Physical Chemistry. Candidates should have several years' research experience, preferably in the Dairy Industry or other Food Industries. They should be capable of organising research work and product development on laboratory and pilot plant scale. Starting salary will be commensurate with qualifications, experience and age, but would not be less than £2,500 per annum. The salary is subject to review annually and may also be adjusted occasionally to meet prevailing conditions. All applications will be treated in strict confidence.—Candidates should apply to: Company Personnel Manager, T. Wall and Sons (Ice Cream) Ltd., 59/61, Park Royal Road, London, N.W.10, quoting reference No. 303.

PRODUCT Development. A vacancy has occurred in the newly formed New Products Development Section for the investigation and development to production stage of new cereal products. Applicants should have experience in cereal milling or allied food manufacture, and an engineering background would be an advantage. The post gives opportunities for promotion to managerial status in an expanding progressive Company. —Please write, stating age and complete details of previous career and education to the Personnel Manager (P.D.9), Quaker Oats Ltd., Bridge Road, Southall, Middlesex.

YOUNG Chemist required for research into new food products by established Company wishing to expand into new markets. Original outlook and positive approach preferred to academic qualifications. Good prospects for right man with ideas and ability to develop them.—Full particulars to Box B5866, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

CHEMIST required to take charge of a Section in the C.W.S. Preserve Group Central Laboratories, Middleton. H.N.C. or equivalent. Experience in food industry advantageous. Salary according to age and experience.—Apply with full details to Group Manager, C.W.S. Preserve Group, Middleton, Manchester.

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ASSISTANT Plant Technician. Kraft Foods Ltd. of Kirkby, near Liverpool, require a male assistant plant technician. Candidates should be university graduates preferably with a degree in chemistry. Previous experience in industry and particularly in the Food industry would be an advantage. Duties will include quantity control and liaison work between production and laboratory. There are good prospects in an expanding company for the right type of man; age, about 25 years. A good commencing salary will be paid and the Company operates a Pension and Life Assurance Scheme.--Please reply in writing with full details to reference "C," Personnel Dept., Kraft Foods Ltd., Moorgate Road, Kirkby.

AN East Anglican company require Junior Draughtsman, preferably with experience in Flour Milling Plant or similar Food Processing Plant layout.—Apply giving full details to Box B5861, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

ENGINEERING company in East Anglia requires Draughtsman. Applicants with sound knowledge of Flour Milling and Provender Plant layout preferred, but experience in installation of general Food Processing and similar Plant considered.—Full details should be sent to Box B5862, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

SITUATIONS VACANT

APPLICATIONS are invited for the position of General Manager of an Edible Oil, Margarine and Soap Factory in British West Indies. High qualifications in administration and sales organisation are essential—preferably with overseas experience. Applications, which will be treated in strictest confidence, should contain full information regarding age, marital and family status, education, experience, qualifications, and references, and be marked "Confidential" and sent to "E.M. & S." c/o The Secretary, The West India Committee, 40, Norfolk Street, London, W.C.2, by September 10, 1959. Suitable candidates will be interviewed in London during week ending September 26, 1959.

REQUIRED: Chemist and Food Technologist to head Research and Development Department of a wheat flour mill with plans to expand in other cereal and allied products using as much as possible locally produced materials.—Apply giving full details of family, education, academic background, experience and salary desired to Box B5873, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

BEECHAM FOODS LIMITED

require a Laboratory Technician in their canning and confectionery factory at Lowestoft. Applicants should have obtained their O.N.C.(Chem.) or equivalent qualification, and preferably have experience in quality control of food products. The Company operates a non-contributory Pension Fund and Profit Participation Scheme.—Applications giving full details of educational qualifications and experience should be addressed to the Personnel Manager, Beecham Foods Ltd., South Wharf, Lowestoft, Suffolk.

PRODUCTION Manager required by manufacturers of jam, marmalade, etc. Excellent opportunity for ambitious person who has necessary technical experience. Knowledge of modern equipment and methods essential. Pension scheme. Applications, which should give full particulars of age, experience and starting salary required, will be treated as strictly confidential.—Box B5847, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

AGENT required for North and Midlands of England by well-known Fruit Canning concern. Must have good established connection with grocery trade.—Please write in first instance to Box B5859, *Food Manufacture*, Leonard Hill House, 9, Eden Street, London, N.W.1.

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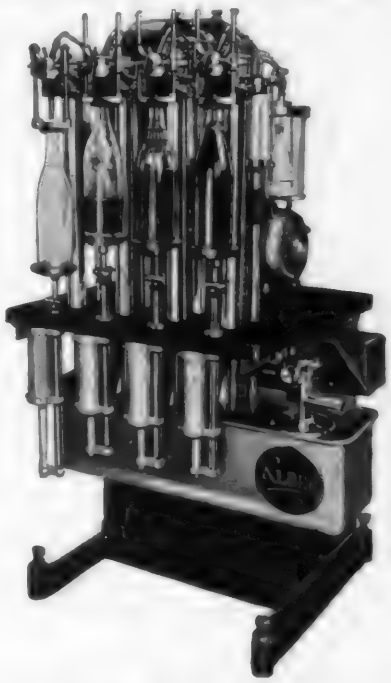

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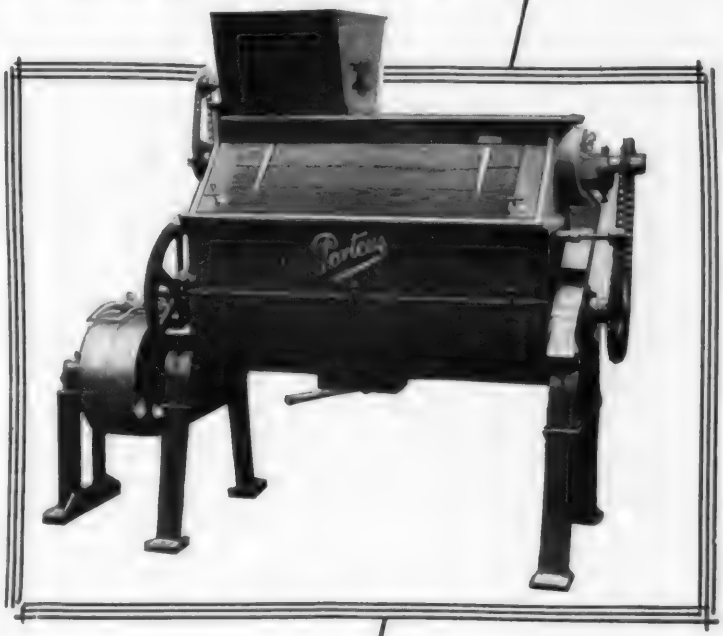

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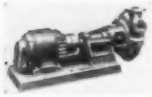

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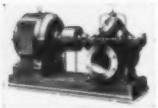

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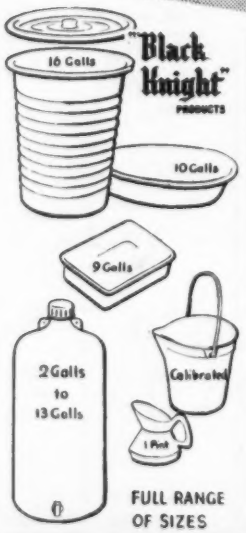

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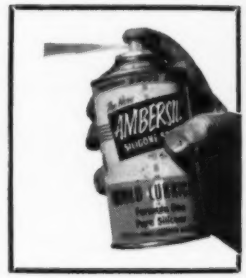

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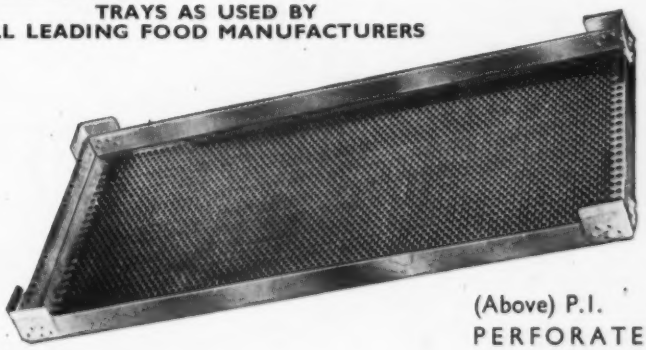

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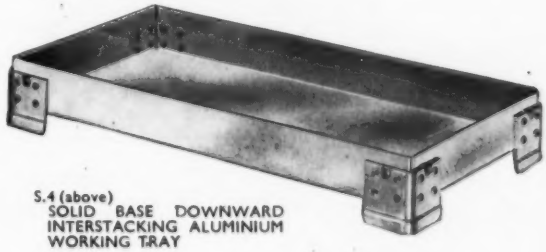

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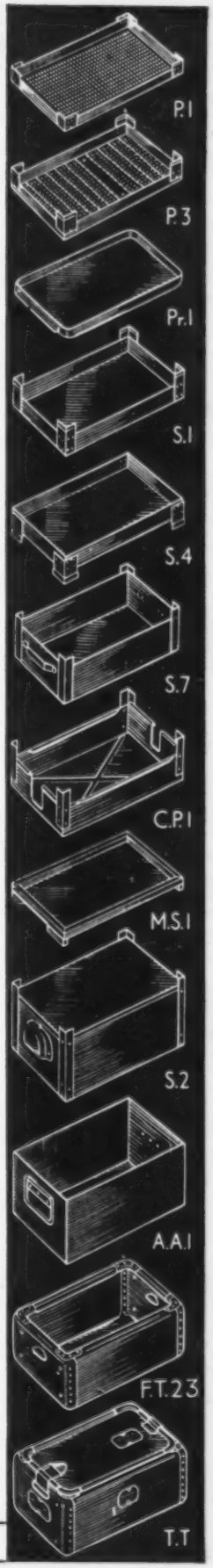

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A MEMBER OF THE HESTON GROUP OF COMPANIES

Tomorrow

Today almost every food manufacturer, including bakers and confectioners, uses gas heat; and recent developments of new gas burners and ovens offer increased outputs at reduced fuel costs. Gas Industry research, together with the consumer service offered by the Area Gas Boards, ensures that tomorrow gas will be even more the preferred heat source in the food industry . . .

AND TODAY—every industry and 12 million homes use **GAS.**

ISSUED BY THE GAS COUNCIL